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THE INVENTORS' INSTITUTE,

4, ST. MARTIN'S PLACE, TRAFALGAR SQUARE.

Chairman of the Council—**SIR ANTONIO BRADY.**

THE various efforts which have been made, and the numerous influences now at work to injure, if not to destroy, Patent Rights; the inefficiency of the many well intended, but ill considered, schemes of Patent Law Reform which have from time to time been suggested, and the tendency of which has generally been to prejudice the Inventor, without advantage to the Public; together with the proceedings so essentially involving the interests of inventors which have already taken place in Parliament, show the necessity of an immediate and active co-operation on the part of those interested in Inventions and in Patent Property, and that an Association for the Protection and Defence of Patent Rights is urgently needed. This Institute has, therefore, been established for the purpose of uniting and organizing the influence of Inventors, Patentees and others. Its objects are:—

1st. To protect Inventors' interests and defend the privilege of obtaining her Majesty's Letters Patent.

2nd To promote improvements in the Patent Laws.

3rd. To facilitate the diffusion of information with reference to Inventions and other subjects beneficial to Inventors and Patentees.

The qualification for Annual Members of the Institute is a yearly Subscription of One Guinea, and for Life Members a single payment of Ten Guineas.

Persons desirous of becoming members are requested to forward their names and addresses to the Secretary.

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London: LOCKWOOD, Stationers' Court.

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John J. Griffin and Sons, 22, Garrick Street.

ATTERBURY'S IMPROVEMENTS IN PERMANENT WAY FOR RAILWAYS FOR SEA AND LAND.

WE AGAIN CALL THE ATTENTION of railway contractors, the Government, and others to this system of lines for railways, whereby cheapness and durability are, it appears, combined, as regards material, in such a manner that a line once laid down in accordance with this invention would retain its durability for an indefinite length of time, no wooden sleepers of any kind being used, and the line itself constructed upon a peculiar principle, without using iron rails, bolts, or chairs as at present; and in case of accident to the carriage it is affirmed that the line would not be disturbed or torn up as under the present system of railway lines.

On the Severn Railway, Gloucester, each tube of twelve feet in length, weighing eighteen tons at £10 per ton will be £180; for five miles over the Severn the cost would be £131,940 in iron alone.

Mr. Atterbury writes to inform us that this can be effected without stopping the Sevren or the navigation, after the first segment is put down One mile per day can be constructed on this principle. Mr. Atterbury also remarks that a railway from Dover to Calais (21 miles) could be constructed very cheaply on this plan, if the work be carried on without delay, by the latter end of July, 1874.

Mr. George Atterbury's address is George-street, West Bromwich.

BRITISH MUSEUM

APPLICATIONS FOR LETTERS PATENT.

*** In this list (Com.) means Invention communicated from abroad.

Further information, as to the progress of these Patents by Notice to Proceed, Sealing, and Specifying, can be obtained at the Office, 21, Cockspur-street, Charing Cross.

On June 12th.—2078 to 2088.—C. Hall. Receptacles used for holding and pouring out liquids. —L. Frèret. Method of producing and reproducing drawings, devices, and designs on porcelain, delph ware, and such like materials (com.)—W. R. Lake. Apparatus for casting copper and its alloys under pressure (com.)—R. Mathers. Driving drums, strap pulleys, or riggers.—M. Mirfield and J. Scott. Machinery for combing wool, cotton, silk, and other fibres.—W. A. Peirce and J. Peirce. Window-blind furniture.—E. W. D. Gray. Printing machines and machines for folding printed sheets.—E. Yewdall. Thermal reflector stove. —Sir W. Thomson and F. Jenkin. Telegraphic apparatus.—F. Hogg. Neckties.—A. F. Campbell. Common road carriages, and appliances to be fitted thereto or arranged therewith.

On June 13th.—2089 to 2106.—C. R. Western. Apparatus for planing, tonguing, and grooving wood, more particularly applicable in the preparation of parquet flooring.—J. G. Garrard. Peg or holdfast for securing tents, strengthening telegraph poles, tethering horses, and for other similar purposes.—H. A. Bonneville. Conductors for telegraph wires (com.)—H. A. Bonneville. Supports for berths, cabins, and shelves for sea-going vessels (com.) (Complete specification.)—S. J. Ditchfield, G. Watson, and J. Childs. Heating apparatus, and the application of hydrocarbon or other volatile oils or spirits for heating purposes and generating steam.—J. Moir and R. J. Miller. Hanging and working window and other curtains.—R. Rewse. Apparatus for obtaining motive power. —P. J. Quinsac. System of round spring cartridge box for revolvers and other fire-arms. —J. Kidd. Steam traps (com.)—H. R. Robson. Governor apparatus for compound marine steam engines.—J. Spurge. Apparatus for paring and slicing potatoes, apples, and other vegetables and fruits (com.)—W. R. Lake. Horse-shoes (com.)—F. H. Greer. Telegraphing and collecting electricity for telegraphing and other purposes.—D. G. Fitz-Gerald and B. C. Molloy. Voltaic batteries.—A. Higginson. Apparatus or appliances for regulating or controlling the supply of steam and other elastic fluids to motive-power engines.—E. Campana. Treating broom, "genista" (Spartium scoparium), thus utilizing and turning to account a fibrous plant heretofore unused, and the method of dressing or preparing such fibre for the manufacture of twine, corn, thread, and other like materials or fabrics (com.)—J. Gough. Relief stamping and printing presses, and appliances for feeding and distributing the ink or colour to such presses.—

On June 14th.—2107 to 2114.—J. Thomas and A. Piggott. Lamps for burning petroleum and other mineral oils.—S. H. Emmeus and E. C. Rippin. Mode of working signals and points on railways, and apparatus employed therefor. (Complete specification.)—H. J. H. King. Apparatus for feeding wool, cotton, or other fibrous materials to carding or other machines.—T. Pirie. Implement for breaking up land.—W. Nisbet. India-rubber waterproof fabrics.—J. H. Wilson. Machinery for tilting barrels, casks, or other receptacles.—C. Cochrane. Treating pulverulent iron ores for smelting.—E. C. Hamilton. Manure.

On June 16th.—2115 to 2124.—J. R. Croskey, F.S.A., F.R.G.S. Pavements.—E. Robbins. Manufacture of cements, plaistic and pulverized compounds combined with chemical and other materials, suitable for being employed in the production of plain and ornamental slabs, moulded and other objects and surfaces, architectural concrete and other structures to which such cements and compounds are applicable, and in the means and apparatus employed in such manufacture; also treating surfaces, objects, and structures preparatory to applying such cements or compounds or other cementitious materials thereto.—C. H. Sharp and R. Parkinson. Washing machines for washing clothes, linen fabrics, and similar articles.—J. Cass. Comber boards and harness used in weaving.—F. H. Grey and W. Harris. Breech-loading express rifles and other small-arms.—J. H Wilson. Steam winches for loading and discharging ships' cargoes and for other purposes. E. Malhère. Machinery for the manufacture of lace.—E. Hodgson. Revolving camera.—D. Ker. Spirits, wines and other liquors.—R. C. Baxter. Apparatus for raising, lowering, engaging, and disengaging ships' boats and other bodies (com.)

On June 17th.—2125 to 2134.—J. Manock and E. Manock. Machinery for reducing and screening or riddling artificial manures and other substances.—B. J. B. Mills. Vulcanizable waterproof gum and process for producing the same (com.)—B. J. B. Mills. Cars or carriages for railways (com.)—F. J. Noble. Rachet braces.—E. Beanes. Brewing and treating fermented liquors.—J. W. Stead. Steelyards for weighing machines.—T. Culpin. Reaping and mowing machines.—R. A. Ray. Composition for removing and preventing scale or incrustation in steam boilers.—G. Little. Automatic telegraph apparatus for preparing paper and transmitting and receiving messages for use with the system of telegraphing known as "Little's automatic telegraph."—H. E. Newton. Apparatus for coupling railway carriages and waggons (com.)

On June 18th.—2135 to 2145.—W. L. Wise. Steam generators (com.)—C. J. Coxhead. Damper action in pianofortes.—G. Fowler. Apparatus for facilitating the charging and discharging of tubs or corves on to and off the cages of lifts.—J. W. Thompson. Lining-bands for hats and caps, and material to be used in lieu of leather for other purposes.—G. N. Sanders and G. N. Sanders, jun. Spikes, pins, bolts, nails, and analogous fastenings, applicable for securing spikes, chairs, and other fastenings.—T. Davison. Spring safety valves.—W. Firth. India-rubber springs for use as draw springs, buffer springs, and bearing springs, and also as segments or sections of elastic tyres for carriage wheels and similar uses.—E. Evans. Portable apparatus for heating water and other liquids, applicable for baths and other purposes.—J. Norris. Apparatus for measuring and registering corn, seeds, and grain.—E. Tuck. Conservatories, greenhouses, and other glazed structures.—R. H. Tweddell, E. Wilson, H. Ashbee, and J. Platt. Facilitating the rivetting of girders and other structures.

On June 19th.—2146 to 2155.—J. Richmond, Joshua Richmond, and T. Richmond. Registering press.—A. B. McGrigor. Hydraulic cements (com.)—W. Ross. Clipping, bottoming, and gathering turnips.—E. Easton. Opening, closing, and securing the doors of strong rooms and safes.—J. N. Paxman. Feed-water heater.—A. Parkes. Manufacture of metallic alloys and apparatus to be used for this purpose.—H. L. McAvoy. Carburetting air for illuminating or heating purposes.—W. Mort. Cooling and freezing machines (com.)—J. Barrow. Slotting and planing metals.—H. J. West. Removing air from the interior of casks or other vessels, and filling them up with beer or other liquid (com.)

On June 20th.—2156 to 2167.—C. Brown. Preserving wood.—G. Spencer. Railway breaks, and the framing and parts of carriages suitable for use with the same (com.)—A. Henry. Breech-loading fire-arms, part of which improvements are also applicable to the locks of ordinary fire-arms.—J. Glendenning. Curtains or flexible partitions for school-rooms, and apparatus for raising and lowering the same.—G. Langlands and J. Johnston. Shuttles.—G. A. Page, jun. Travelling valise or knapsack (com.)—G. Nimmo. Steel furnaces.—J. M. Morris. Apparatus for producing mechanical illusions in theatrical exhibitions, parts of which apparatus are also applicable to other purposes.—C. T. Colebrook. Steam cylinders for steam pumping machinery and steam engines.—D. Ainsley and P. Hall. Boring machinery.—T. Murphy. Machinery for cutting or forming cork, wood, bark, and such like materials into stoppers for bottles and vessels, or into articles of similar character.—E. Whitworth. Reaping machines and apparatus for making up cut crops into sheaves.

On June 21st.—2168 to 2178.—J. Platt and R. H. Tweddell. Rivetting and punching machinery.—C. Binks. Materials for and methods of decarburating cast iron and converting iron into steel.—J. Griffith. Steam boilers. (Complete specification.)—F. Wirth. Turbines (com.)—A. A. Crespin. Transmitting despatches and the apparatus connected therewith.—W. H. Mitchell and R. Jordinson. Carding engines.—K. M. P. Louttit. Manufacture of gas for heating and lighting purposes, and the apparatus employed therefor.—C. P. Moody. Implements for cultivating land.—L. Griswold. Sewing machine. (Complete specification.)—A. G. Hunter. Apparatus for the manufacture of gas for illuminating and heating purposes (com.)—A. M. Clark. Tanning and otherwise treating hides and skins (com.)

On June 23rd.—2179 to 2191.—C. C. Cramp. Locomotive engine for tramways, railways, and other purposes.—C. C. Cramp. Improved rotary engine.—M. Trattles. Making portable fires useful in army camps, also private and public offices, and general domestic purposes; can be carried in the open air for light warmth on the road in foggy weather.—F. Zysel. Motive power.—J. H. Parkinson. Looms for weaving.—C. Touaillon. Horse shoes (com.)—S. Herrick. Treadles for sewing machines. (Complete specification.)—S. A. Samuelson. Locomotives, traction engines, and other carriages moved by steam power.—J. Whitehead. Dandy rollers used in the manufacture of paper.—A. G. Brookes. Rotary engine to be worked by steam or other fluid (com.)—T. Whitehead and H. W. Whitehead. Improvements in "Noble's" combing machines.—A. M. Clark. Machinery for printing oil-cloth or other fabrics (com.) (Complete specification.)—W. G. Ingall and C. J. Parsons. Coffin furniture.

On June 24th.—2192 to 2205.—A. Sweet. Water-waste preventers and waste-preventing cocks, taps, or valves.—W. Powell. Breech-loading small-arms.—W. E. Gedge. Machine for paring or cutting and shaping heels for boots and shoes (com.)—J. Macintosh. Tobacco pouches or receptacles for containing tobacco, applicable to other purposes.—W. H. Helm. Looms for weaving.—W. Jenkins. Prevention of leakage in wooden casks.—R. Willacy. Spreading or distributing manure or other substances over ground.—R. Nicholson. Junctions for gas and water mains and branches.—H. E. Newton. Bits for horses and other animals (com.)—J. Stubbs and J. Corrigan. Machinery for winding two or more yarns or threads of cotton and other fibrous materials on to one bobbin or spool preparatory to doubling the same.—A. V. Newton. Fastening of hat pegs or hooks (com.)—D. Pidgeon and W. Manwaring. Reaping machines.—J. Evershed. Tanning hides, and apparatus to be used for this purpose.—A. M. Clark. Feed-water heating apparatus for steam boilers (com.)

On June 25th.—2206 to 2216.—J. Stewart. Mode and means of constructing buoys or apparatus for floating bodies in deep water, and thus saving life and property.—R. Tomlinson and R. Moss. Looms for weaving.—E. T. Hughes. Picker motion (com.)—J. Imray. Modules or apparatus for regulating and measuring the delivery of water or other liquids (com.)—W. Spence. Engines worked by volatile liquids at a low temperature (com.)—J. Mabson. Instruments for drawing corks.—G. Haseltine. Braiding attachments for sewing machines (com.)—S. E. Asquith and F. A. Greenwood. Machinery for spinning, doubling, and twisting fibrous substances.—O. C. D. Ross.—Production of vapourized air for heating purposes generally, and in means for regulating and controlling the admixture of vapourized and other air when employed for such purposes.—N. Ager. Apparatus to facilitate the opening and closing of apertures in barrels, cisterns, and other similar vessels.—E. Mapplebeck. Copper tubes and copper-ended brass tubes.

On June 26th.—2217 to 2224.—G. Haseltine. Apparatus for extinguishing fires (com.)—L. Schwarz. Process for economizing fuel by the use of steam. (Complete specification.)—T. Mansbridge. Obtaining increased security to the locks of doors or gates to rooms and other places.—W. R. Lake. Process and apparatus for preserving meat, fruit, vegetables, and other like perishable substances (com.)—G. T. Bousfield. Tunnelling. (com.)—J. M. Plessner. Inkstands.—J. Carter. Machinery for spinning, doubling, and twisting fibrous substances.—T. Payne. Invention of "Payne's anti-corrosive boiler fluid."

On June 27th.—2225 to 2239.—C. W. Siemens. Electrical apparatus for sending by means of finger-keys, and for receiving and printing telegraphic messages, parts of these improvements being also applicable to electric telegraphic apparatus generally (com.)—J. Boyd and T. A. Boyd. Machinery for winding yarn or thread.—A. Kimball and J. Morton. Sewing machines.—J. Milroy. Columnar foundations for piers, quays, and similar structures.—B. Johnston. Composition for preserving buildings, ships, or any structure whatever exposed to damp or wet, or any other external influences.—M. Eustace, M.D., J. Kennan and T. Kennan. Apparatus used in the cultivation of green crops.—B. Haas, jun. Dial indicators for checking the drivers of public carriages. (Complete specification.)—F. H. Varley. Transmitting and recording telegraphic signals and means of transcribing.—W. Rowan. Steam engines with a general arrangement of valves for the ingress and egress of the steam, and the mode of applying and working same.—J. Partridge. Means of and appliance for preventing carriage and other wheels leaving the axles in cases of breakage or from other causes.—G. T. Bousfield. Lamps to be used for cooking, heating, and lighting purposes (com.)—A. R. Arrott. Soda and chlorine.—J. Hunt. Artificial fuel.—F. Curtis. Sewing machines, and channelling and bevelling machines connected therewith (com.) (Complete specification.)—E. H. Hale. Bottle wrapper.

On June 28th.—2241 to 2257.—G. E. Laverack. Apparatus to prevent passengers from opening the doors of railway carriages whilst the train is in motion, applicable also for simultaneously securing and releasing the doors of the cells of prisons, asylums, or for other similar purposes where a series of simultaneous actions are required.—R. A. Gooding. Securing corks in bottles containing fluids under pressure.—W. Wright. Improvements in and applicable to steam boilers for the purpose of increasing the draught and utilizing the products of combustion therein.—T. Singleton. Machinery or apparatus used in the preparation of yarn, and in the manufacture thereof into textile fabrics.—D. A. Graham. Manufacture of gas and the apparatus employed therein.—C. W. Siemens. Caloric engines (com.)—J. Carter and J. E. Carter. Water or stench traps.—A. W. Hosking. Combined cheque, facsimile, and receipt book.—W. E. Garforth. Steam pumps for raising or forcing fluids.—J. Rome. Actuating slide valves.—C. Simon. Mixing machine.—T. Richmond, W. Richmond, and J. Dodgeon. Damping the warp when weaving textile fabrics.—H. Greaves, T. T. Pearson, and J. Brickhill. Woven fabrics.—E. Field. Apparatus for preventing or counteracting incrustation in and detaching it from steam boilers or apparatus for imparting heat to liquids.—G. Haseltine. Valve-gear for direct-acting steam engines (com.) (Complete specification.)—J. P. Estlin. Boat plugs.—G. Haseltine. Inhaling apparatus (com.) (Complete specification.)

On June 30th.—2258 to 2273.—H. A. Bonneville. Machines for spinning wool, cotton, silk, and fibrous materials in general (com.)—A. C. Henderson. Water, liquid, gas, and steam gauges (com.)—A. H. Cramp. Improved

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Scientific and Literary Review,

AND RECORD OF PROGRESS IN

ARTS, INDUSTRY, AND MANUFACTURES,

INCORPORATING THE

JOURNAL OF THE INVENTORS' INSTITUTE.

SEPTEMBER 1, 1873.

COMPULSORY PATENT LICENSES.

REPORT OF HON. COMMISSIONER OF INVENTORS' INSTITUTE TO THE INTERNATIONAL PATENT CONGRESS AT VIENNA.

The question referred to in the heading of this column is clearly so important, and is so ably dealt with by Dr. Collyer, the Hon. Commissioner of the Inventors' Institute to the Congress at Vienna, in his report, that we feel that we cannot do better than devote our first pages to that Report.

Report.

On Monday, the 4th of August, the Congress met for the first time in the Grand Hall of the Jury Pavilion in the Exhibition Grounds. There was a large number of members present.

His Excellency Baron von Schwarz-Senhorn, as Director-General of the Vienna Exhibition, opened the Congress with an address of welcome delivered in both the German and English languages, expressive of his sense of its great importance.

The Congress then proceeded to the election of its officers, and elected by acclamation, on the proposition of the preparatory committee, His Excellency Baron von Schwarz-Senhorn, honorary president, Mr. William Siemens, C.E., F.R.S., D.C.L., &c., member of Council of the Inventors' Institute, London, acting president; Mr. Thomas Webster, Q.C., London, Government Councillor; Dr. Franz Neumann, of Vienna; Dr. Werner Siemens, of Berlin; Dr. Engen Langen, of Cologne, President of the Society of German Engineers, and Mr. Hamilton Hill, of Boston, United States, vice-presidents, to which number was added, on the proposition of Baron Schwarz, Aulic Councillor, Chevalier von Engerth, of Vienna, and the chief of the Patent Office in Vienna, Dr. von Rosas, Dr. Ratkowsky, Vienna, Professor Dr. W. F. Esner, Vienna, Dr. Rosenthal, Cologne, Mr. Carl Pieper, C.E., Dresden, and Professor Blake, New York, and Mr. Kaupe, of St. Petersburg, secretaries.

The meeting having adopted the order of proceedings, and the rules to be observed during the debates, the Congress entered upon the consideration of the propositions prepared by the preparatory committee, which were as follows:—

1. That protection of inventions is to be guaranteed by law in all civilised countries.

Protection by patent, if guaranteed in an adequate and judicious manner, will be conducive to stimulate useful inventions, to improve the mode of production, thereby increasing production itself, and making it cheaper, and to extend the consumption, thus promoting national welfare. On the other hand, if there be none, or an inadequate protection of inventions, national industry will become stagnant and retrograde, the spirit of invention will be stifled, the introduction of new inventions checked, and the native inventor forced to seek a more favourable field of action elsewhere, where his talent will be recognised and his labour protected and rewarded.

Introduced by Mr. Carl Pieper, C.E., of Dresden.

II. If the object of patent protection is to be attained in an adequate manner, it will be imperative that the various States should bring about, as speedily as possible by international agreement, a reform of the patent legislation.

III. As regards the rules to be established, the Congress recommends in particular the English and American laws as a basis, as well as the draft of a law proposed for Germany by the Society of German Engineers.

Introduced by Dr. Hermann Grothe, of Berlin.

IV. As fundamental principles for an international agreement on patent legislation, the following points should be kept in view:—

(*a.*) It is desirable that the various States should publish and exchange all patents directly after they have been granted, in such a manner that copies of each patent may be inspected by the inhabitants of other countries.

Introduced by Professor Dr. Klostermann, of Bonn.

(*b.*) It would be, if at all possible of accomplishment, advisable that each State should admit and attach to its patent office representatives of other countries.

Introduced by Professor Dr. Klostermann, of Bonn.

(*c.*) It is to be recommended that a system of preliminary examination should be adopted, analogous to the provisions of the laws above mentioned.

Introduced by Dr. Rosenthal, of Cologne.

(*e.*) The expenses of obtaining and keeping in force a patent should be moderate in all countries, and based upon a progressive scale.

Introduced by Professor Jaunasch, of Prokau, in Silesia.

(*f.*) Only the first inventor, his heirs and assigns, are entitled to a patent.

Introduced by Dr. Ratkowsky, of Vienna.

In place of, as originally prepared, Resolution I, "The protection of inventions is to be guaranteed by law in all civilised countries," &c., as above, was introduced to the Congress in a long and much applauded speech by Mr. Karl Pieper, C.E., Dresden, dilating on the present state of the patent legislations, supported by statistical data, in America, England, &c., with the patent legislation of which countries that of Prussia contrasted most unfavourably, as being the worst in existence, in practice and application, Dr. William Siemens, proposed to adopt the following:

GENERAL PROPOSITIONS.

The International Congress may please to declare:

"Patents of inventions with obligatory publications are necessary and indespensable to the preservation and promotion of technical progress, because:

"*a.* They offer the only practicable and effectual means of introducing, without loss of time, and in a satisfactory manner, new ideas and improvements to the general notice of the public.

"*b.* They render the work of the inventor remunerative, and thus induce men of talent to devote their powers, time, and means to the introduction and carrying out of new methods of manufacture and technical improvements, or attract foreign capital, which, without patent protection, would seek and find a safer investment elsewhere.

"*c.* By the obligatory and complete publication of the invention forming the subject of the patent, the great sacrifices of time and money, which would be otherwise imposed upon the industry of all countries by carrying out inventions, will be considerably diminished.

"*d.* The manufacturers' secrecy, which is the greatest enemy of industrial progress, loses thereby its principal support.

"*e.* The countries which have no good patent laws are injured greatly in consequence of the emigration of their inventive talents to those countries in which their labour and their products are legally protected."

The general debate on this proposition was not without interesting incidents. Dr. Werner Siemens, in a very clever speech, explained, in a precise manner, the reasons for maintaining the system of patent protection, which contributed most effectually towards the speedy extension and application of new inventions. It was this protection of inventions which was the death-blow to the secrecy of manufacture, which through generations clogged all progress. Then came a declaration from the minority—the party opposed to all patents—for whom Professor Dr. Neumann (Vienna) acted as spokesman. He stated that already, ten years ago, he had publicly given utterance to the same views, and he and his friends, though small in number as yet, were of opinion that the principle of liberty, *i.e.*, the principles of free trade, must also be applied to inventions and patents. The latter were incompatible with the progress of our time, with free trade; they were opposed to all principles of liberty, as could be proved by their own history, since they were intended as a compensation for the rights formerly possessed by corporate institutions and guilds.

The President then formally announced to the assembly that Dr. R. H. Collyer, of London, was received as the duly accredited Honorary Commissioner from the Inventors' Institute.

On the general question, as to the advisability of patent rights being accorded to the inventor,

Dr. Collyer said—Nature had not endowed all mankind with the same genius or mental qualifications in the development of new ideas in regard to the amelioration of the wants and necessities of society. Every day experience taught that great disparity existed amongst men, as to their capacity to become inventors or discoverers in the true sense. Civilization, education, and progress were promotive of invention, but then, for a man to become a successful inventor, a special education was required in regard to the subject-matter of his invention; in a word, it would be futile for a man to attempt making improvements in those departments of the arts which required a knowledge of chemistry without being acquainted with that science; the same applied to mechanism. It is true that suggestive ideas often arise in the minds of intelligent persons who are unacquainted with either chemistry or mechanism, but such were necessitated either to themselves undergo a special course of training or to resort to the assistance of the expert in those subjects, if the ideas thus conceived required to be practically brought into operation or public use. Dr. Collyer next dwelt on the fact that society had framed laws for the protection of *property*; in fine, the chief function of the law was the protection of property in one form or another. How was property attained, if not by mental or by bodily exertion? In the present day the really useful application of our time to the accumulation of the means of existence in the various forms of every-day life, required the exercise of the brain. No one refused to recompense the professional man, the mechanic, or artisan for his work. If, then, the inventor, whose education and talents render him fittest for the vocation, devotes his time, money, and attention to the special improvements of society—what reason is there for excluding this labour from the category of the remunerative? *None.* A patent is a compact between society and the inventor. A special right granted for a few years only is indeed but a niggardly recompense for what society receives the perpetual benefit of. There has arisen a mistaken idea in reference to a patent being a monopoly. As a patent is only a grant for that which had no prior existence, it is difficult to imagine how such a confusion of terms should have occurred. A monopoly is a grant of the exclusive right or liberty to a person or persons in regard to something which up to the time of such grant was free to the enjoyment of everybody. It is thus an *abstraction* of something from the common rights of the public, whilst a patent for a new invention operates to procure *addition* to those rights. The protection of the development of a new application in the arts or manufactures cannot therefore be a monopoly according to any recognized meaning of the term. All inventors were of opinion that their rights had not been heretofore protected by law in consonance with the spirit of the age. What inventors demanded was a patent law framed by those who understood the necessities of the inventor, many of whom were working men, and others who possessed very little wealth. All the patent laws now existing were devised by mere lawyers, who had generally followed their own fanciful theories as to patent rights being in restraint of trade. It was to be desired that an international law should be based on enlarged and broad principles, such as will really protect the poor inventor, for it was as true now as when first enunciated that "necessity is the mother of invention." All the really great inventions have arisen from the necessity—the necessity of the improvement, and the *necessities* of the man. The greatest incentive to mental exertion is that prompted by the ambition to become rich and powerful. *Inventions* at all periods of the world's history has offered the greatest prize for human labour. No one possessed of a right sense of what constitutes the greatness of nations could ignore the pretensions of the inventor in demanding from the State the most liberal legislation in protecting his *rights*, attained by dint of the hardest and most toilsome of all labour—mental function—in the development of a new idea as applicable to the wants and necessities of his fellowman.

The original resolution, as amended by Mr. Siemens, of Berlin, "That the inventor-rights be recognized by a suitable international patent law," was put to the assembly, and carried with only four dissenting votes.

After this proposition had been thus disposed of a number of other resolutions, which had been agreed upon by the Preparatory Committee, were brought under consideration. The programme, including that above stated, being as follows:—

"Resolution I.—The protection of inventions is to be guaranteed by the laws of all civilised nations under the condition of a complete publication of the same; because:

"*a.* The sense of right of civilised nations demands the legal protection of intellectual work.

"*b.* This protection affords the only practical and effective means of introducing new technical ideas, without loss of time, and in a reliable manner to the general knowledge of the public.

"*c.* The protection of invention renders the labour of the inventor remunerative, and induces thereby competent men to devote time and means to the introduction and practical application of new and useful technical methods and improvements, or to attract capital from abroad, which, in the absence of patent protection, will find means of secure investment elsewhere.

"*d.* By the obligatory complete publication of the patented invention, the great sacrifices in time and of money, which the technical application would otherwise impose upon the industry of all countries, will be considerably lessened.

"*e.* By the protection of invention the secrecy of manufacture, which is one of the greatest enemies of industrial progress, will lose its chief support.

"*f.* Great injury will be inflicted upon the countries which have no rational patent laws by the native inventive talent emigrating to more congenial countries, where their labour is legally protected.

"*g.* Experience shows that the holder of a patent will himself make the most effectual exertions for a speedy introduction of his invention."

"Resolution II.—An effective and useful patent must have the following principles:—

"*a.* The inventor or his legal heir only can obtain a patent. A patent cannot be refused to a foreigner.

"*b.* In order to carry out the principle stated above (*a*), the introduction of the system of a preliminary examination is recommended.

"*c.* A patent for an invention should be granted for fifteen years, or the option should be to extend it to that period.

"*d.* The granting of a patent must be accompanied by a detailed and complete publication, which renders the practical application of the invention possible.

"*e.* The cost for the granting a patent should be moderate, but in the interest of the inventor an increasing scale of fees should be fixed, so as to cancel an useless patent as soon as possible.

"*f.* It should be easy for anyone to obtain, through a well-organised patent office, the specifications of any patent, as well as to ascertain which patents are still in force.

"*g.* Laws should be passed by means of which a patentee may be compelled, in cases of public interest, to allow the use of his invention for a suitable remuneration to all *bonâ fide* applicants."

For the rest, and especially with respect to the proceedings in the granting of patents, the Congress refers to the English, American, and Belgian patent laws, and to the proposition made by the union of German engineers for a patent law of the German Empire.

"Resolution III.—In consideration of the great difference between the existing patent laws, and in consideration of the altered state of international communication, the necessity of reform becomes evident, and it is to be strongly recommended that the different Governments should endeavour to arrange, as soon as possible, an international understanding on the patent laws.

"The not executing of a patent in a country is no reason for its becoming void in that country, as long as the invention has been carried out once, and the possibility is there that the right of using the invention can be obtained by any inhabitant of this country."

COMPULSORY LICENSES.

The above proposition (*g*) as to compulsory licenses was originally as follows:—

"It is desirable that measures be adopted by which the patentee shall be compelled to allow any one to use his invention who may desire it."

This came on for discussion at the sitting on 7th Aug., 1873, when Dr. R. H. COLLYER, the hon. commissioner of the Inventors' Institute, rose and said:—

It has been stated here that compulsory licenses would appease the opponents of the patent system—such men as Sir William Armstrong, Mr. Macfie, and others, because such licenses would take away from patent right the principal objection, namely, that of being a monopoly. This is certainly the most important question that has or will come before this Congress. There is wide-spread error as to the true meaning of the word monopoly. Originally and truly it meant the grant of an exclusive privilege by the king or prince, for which he received a remuneration, to one person in a city or district in the vending of the necessaries of life. One man had a monopoly to sell and make bread, another to vend meat, another clothing. This was a gross violation of public common rights, an injustice of the most intolerable description, as the public were thus forced to purchase the ordinary necessaries of life at exorbitant prices. See how entirely different to this is the granting of letters patent to an inventor for a novel invention, which is only founded on a right already possessed—a man's dominion over his own thoughts—one which had no prior recognition and limitation of a right in regard to things having no previous existence. It therefore could not injure the body politic, and it could not take away any existing rights or privileges. In short, it could not be regarded as a monopoly in the moral or legal signification of the term. What is a patent right at the best but a niggardly recognition for a limited period of years conceded to the original and true inventor, who has devoted his time, mental labour, and expended his means in the completion of his invention, the adoption of which will ameliorate or remove the defective condition of a want which society requires, which after the few years of the patent right has the entire benefit of the invention in perpetuity. What does all property rest upon, whether in goods, houses, lands, but exertion, whether in the sphere of commerce or of mind? These, if the strained meaning which the opponents of patents attach to monopoly is be followed, are all monopolies, as no one has a right to sell or use the goods, to trespass on the lands, or enter the house of another without his permission. Certainly, if he were obliged to grant a license to any one who wished to sell or use his goods, or chose to apply to enter his house, or traverse his lands, they would no longer belong to himself. In this sense, all property is a monopoly, as it is an appropriation to one as against the many. All legislation, from the earliest periods, has tended to maintain this great principle, that whatever a man obtains by his industry belongs to himself. If, then, this holds good as to material possessions, how much more obvious must be the reason which should concede to a man that which he mentally creates when calculated to benefit his fellow-man. The first idea of a compulsory license emanated from certain members of the Inventors' Institute. It has been the topic of constant discussion for several years past, and I am in a position to declare that, with scarcely an exception, the idea has been strenuously opposed by the practical inventor. It originated in the minds of those who really had no experience as to the troubles, the difficulties, the annoyances, the expenditure of time and money in the development or exploitation of novel inventions. It is, as a rule, not until an invention has attained many years of practical existence that even the inventor himself is enabled to remedy the practical deficiencies incidental to nearly all new inventions in the early stages of their existence. As a rule, it would require at least five years to do so. If the compulsory license were to be granted on the issue of the patent, what would be the consequence? A rich manufacturer, or a capitalist, would extinguish the original inventor, and render his patent valueless so far as he was concerned. The compulsory license system would be most unjust—I might say iniquitous—in its working. Take the case of two rival manufacturers—one, in order to improve and cheapen the mode of production, outlays a fortune in making experiments so as to render his invention perfect; the other manufacturer, who belongs to the "leave-well-alone" class, who has incurred no risk, spent no money, and has not devoted a moment's mental labour on the subject, by the payment of a ridiculous license fee, has all the advantages of using the invention, and competing with the man whose ingenuity, perseverance, and risk of failure, entitles him alone to the prize. Inventions do not come from the brain—as Minerva from the head of Jupiter—perfect, armed *cap-a-pie*. The history of nearly all inventions is a narrative of progressive development of practical perfection. If ever any proposition was calculated to undermine and destroy the ambition—the *amour propre*—the perseverance of the inventor—it is the knowledge that he is labouring, perhaps for years, spending all his resources for the benefit of those who would, by the payment of a paltry pittance assessed by themselves or their friends—use the invention, and who would have it in their power to destroy its successful introduction if it suited their purpose so to do, or make an important improvement, secure a patent, and leave the original inventor with no remedy, ruined; and this would often be the case in practice. Suppose the inventor who, after spending much time and all his money to perfect or improve the existing mode of manufacture, fails entirely to arrive at a successful result—and this is no imaginary case, it occurs every day—what, then, is his reward but scoffs, mockery, and the jeers of his fellows, for having been such a madman as to ruin himself in scheming to get a fortune? How many of these men, real inventors, die unknown to the world in penury and want? The inventor is environed with perils from the moment he leaves the ordinary routine of every-day life. He has no peace; often he deprives his family of the necessaries of life so that his means, poor as they are, may go towards the development of his invention. This is but a faint portraiture of the actual state of things. But when a man, by his indomitable perseverance, and by the exercise of his genius and mental capabilities, achieves the object of his research, why is the fruit of his labour to be taken from him by an artfully-devised plan of compelling him to grant a license to whomsoever may desire it? It behoves us to acknowledge the great boon which modern invention has conferred on society—the steam engine, lighting by gas, and the electric telegraph. All these great inventions, and many others, have been gradually developed. These splendid results and applications of scientific truths to the wants and necessities have been attained by constant trials and experiments. The theme is inexhaustible, and my object now is not to elaborate or enter into details of the advancement of special inventions; they are no doubt familiar to you all. But I must appeal to you, in the name of common sense, not to ignore the fact that no one is so competent or capable of bringing his invention to perfection as the inventor himself. Gentlemen, we are now treading on most dangerous ground, for the adoption of the proposition before us would virtually take from an inventor by a side wind, or artfully-devised strategy, every benefit which he would otherwise enjoy, if his patent is trammelled with a clause obliging him to grant a license to whomsoever may desire to obtain it. By it the original patentee, whose conception has brought into existence a new creation of mechanical or chemical application, may be ousted by some other person, of no original genius, no inventive mind, though quick to apprehend, and keen to perceive practical defects of detail. He at once demands a license from the original patentee, takes out another patent for so-called improvement, and actually ruins the original inventor, whose genius, time, and money, brought the new thought into practical operation. Indeed, such a clause would be opening the door to all kinds of fraud and deception, as the inventor will be necessitated in self-protection to present his invention to the world in such a shape as to prevent his rival from utterly destroying its commercial value. Therefore, as the hon. commissioner of the Inventors' Institute of Great Britain, in the performance of an imperative duty, I must vote against the original proposition that the inventor should be absolutely and unreservedly, and at once, compelled to grant licenses to use his patent; the only modification that I am prepared to assent to is, that after at least five years from the issue of the patent, a license, under certain regulations, may be issued to any responsible applicant, provided the peculiar circumstances of the case may render this necessary for the maintenance of the industrial interests of the public. We want no favours; we only advance just claims, and will not knowingly make concessions to appease those whose only argument is the false proposition that a patent for a novel and useful invention is a monopoly.

After two days' discussion the amended resolution (g), above given, was passed by a vote of 42 for and 17 against.

At the closing of the Congress the committee was constituted as a permanent executive committee, with the power to publish the resolutions adopted, and to submit them to the various Governments. The committee is also authorised to choose members, and to prepare and convoke in a suitable manner a second Congress.

On Saturday, the 9th of August, the president and members of the council of the patent Congress, were introduced by Baron Schwarz to the two Ministers of the Austrian Empire, to whose department the resolutions of the Congress belong.

Reviews.

Ventilation of Buildings. A Paper read before the Society of Civil and Mechanical Engineers, 10th of January, 1873. By W. F. Butler, Hon. Treasurer. London: Kell Brothers. 1873.

This paper is a very praiseworthy essay on the important subject referred to. The following amusing sketch of ancient attempts at ventilation, with some remarks on its true nature and effects, will afford the reader a good specimen of the nature of the work:—

That ventilation is a new requirement will, I think, be readily acknowledged, when we consider the every-day life of our forefathers who lived prior to the close of say the 17th century. We shall see that, in by far the larger number of cases, theirs was an out-of-door life. Their days were spent mostly in the field either in the sports of the chase, in war, or in the occupation of husbandry.

If they were wealthy, their halls were large and lofty, with enormous fire-places, and loosely fitting doors and windows, from which innumerable currents of air rushed to the fires. If they were poor they had, amid all the dirt and wretchedness which surrounded them, no want of air, as any one who has seen an old English or Welsh cottage will readily admit.

The windows, too, down to nearly the period I have named were, in most cases, filled with nothing better than shutters or louvre boards, glazing being then a rarity, at least in houses of the commoner sort, for though glass was known to the Phœnicians and to the later Egyptians, whose glass works at Sidon and Alexandria were famous throughout the then civilised world, and although it was employed by the Romans to some extent in their windows, as is shown by the remains found in Herculaneum, window glass was not manufactured in England, I believe, prior to the middle of the 16th century, and must up to that time at least, and probably long after, have been an article of luxury, while its substitutes, oiled paper or plates of horn, can hardly have been in general use, at least in the dwellings of the poorer classes in country districts.

In cities and towns, doubtless, greater comfort if not better sanitary arrangements prevailed. But these were always the strongholds of fever, plague, and cholera. In towns the "black death," so much dreaded in the 14th century, had its head-quarters, and from them it extended its devastating arms into all the surrounding country. I believe that to defective ventilation not less than to bad drainage and insufficient water supply, may be traced these scourges of the human race, which now seem rapidly giving up their strongholds to the invading forces of science.

We cannot wonder on looking at such places as the hall of Bodiam Castle, for instance, in which were two fire-places, each about 55 feet wide and 7 feet high, that people found a settle, a comfortable article of domestic furniture, and viewed the chimney corner, where they crowded like smoked hams, as the choicest parts of the room. Nor must we be surprised when we are told that the curtains enclosing the couches whereon reposed the proudest beauties of the land shook in response to every wind that blew.

If the wretched hole which they show in Carnarvon Castle as the birthplace of Edward II. be indeed the room in which that unhappy prince first saw the light, I can only say that whatever advantages the men of a former age may have had over us, certainly domestic comfort could not be said to be one of them.

The first person who seems to have turned his serious attention with any practical result towards the subject of this paper, at least in England was, I believe, Dr. Desaguliers, who, in 1723, was called in to ventilate the House of Commons, upon which Wren had before tried his hand.

The doctor discharged his commission with success, but he unfortunately provoked the hostility of one very important individual, viz., the housekeeper, a certain Mrs. Smith, who effectually extinguished him by not lighting the fires, upon the action of which his system depended, until the House had sat for some time, and the Chamber had got thoroughly heated, so that we cannot wonder some of the members should have considered the design of cooling the House was frustrated, and requested the doctor to employ other means. He accordingly invented a centrifugal wheel, or blowing machine, so constructed as to force air either into or out of the House, according as either was required. This machine was put in charge of a man called the ventilator, whose duty it was to wait upon Mr. Speaker every day for orders. Dr. Desaguliers was next applied to by the Admiralty to ventilate ships, but here, as might be expected, he got inventors' allowance, viz., more kicks than halfpence. All his troubles with Mrs. Smith were nothing compared with the treatment he and his invention received from Sir Jacob Ackworth, the surveyor to the Navy, who seems to have been the *beau ideal* of an official. When the doctor attended by appointment on board the ship in which his machine was to be tried, Sir Jacob did not appear, but hearing that the company were pleased, afterwards told Dr. Desaguliers that at the next experiment he (the doctor) need not attend, as the carpenter could manage the ventilation.

When the second trial came off, Sir Jacob had scuttle holes cut at each end of the ship and then hoisted enormous wind-sails, and when, as might naturally be expected, he found that more air came through his wind-sails, which were about 2″ 6″ diameter, than through the Doctor's tubes, which were 5″ × 3′; he said he could not stay longer, and that he was sorry the machine had answered no better. Sir Jacob, however, sent his "humble duty" to Dr. Desaguliers, and thought his invention might be a very pretty thing in a house.

The Lords of the Admiralty never came near nor gave themselves any trouble about it, and so the doctor found his invention would not be used in the Navy.

The next person who came forward in the cause of ventilation for the Navy, was Mr. Sutton, a brewer by trade. He made use of the fire which cooked the provisions of the ship's company as the motive power, laying pipes from all parts of the ship to the ash-pit under the grate. When the ashpit-door was closed, no air could get to the fire except through the pipes.

The result was considered satisfactory, and the apparatus was ordered to be fitted up on board the *Norwich* man-of-war.

Mr. Sutton had also to contend with Sir Jacob Ackworth, but he had found powerful friends in Dr. Mead, the king's physician, and Sir Charles Wager, so that the old knight's opposition was rather passive than active.

This, I believe, is one of the first, if not the first, instance of the scientific use of the common fire as the power for ventilating any structure. This method has been called thermo-ventilation by Mr. Bernan, to whose work, as well as those of the inventors, whose names I have mentioned, I am indebted for many of the particulars given above.

However successful Mr. Sutton may have been in getting his apparatus fixed, he failed when he applied to the Admiralty for some reward for his services; they simply took no notice of him or his petition, although the *Norwich* had returned to England from the Guinea Coast, with the loss of only two men, and the Captain reported her singularly healthy.

Meanwhile, a certain Dr. Hales had been pressing an invention of his own upon the notice of my lords. This he called a ship's lungs. The machine was, in fact, a magnified bellows, differing somewhat in construction from common bellows certainly, but the same as far as action was concerned. It consisted of a large square case with valves, enclosing a hinged mindrif, which rose and fell by the action of a long handle or lever, worked by some of the ship's company. The whole machine was cumbersome, requiring about four men per hour to work it, and could not, certainly, compare with the blowing-wheel of Dr. Desaguliers. It soon fell into disuse, and became a thing of the past.

Mr. Sutton, who had at last got £100 from the Admiralty, exulted over the failure of the ship lungs, but his triumph was short lived, for, in the course of a few years, he found that he was left out in the cold also, and the old wind-sails were again on duty.

The illustrious names of Count Rumford and H. Davy, as well as those of a host of other persons less celebrated, which figure in the annals of ventilation, attest the importance of the question. It is time, however, for me to take leave of this portion of my subject, of which volumes might be written, and to consider the causes which make ventilation a necessity.

These may be classed under different heads, viz.: first in private houses. The necessity for ventilation will arise from commonly (A) the presence of fires; (B) artificial light; (C) the presence of persons living in the house, that is, from the air required by them, as well as the exhalations from their bodies, and (D) from badly constructed waterclosets, cesspools and drains. 2nd. In factories there will be, in addition to the above causes, the presence in the air of a vast quantity of minutely-divided fibre and dust, which is highly prejudicial to the health of the workers, and also the fumes from chemicals, &c., where the manufacture of such is carried on. (3rd.) In sewers. The necessity of sufficient ventilation will almost entirely arise from the generation of poisonous gases by the putrid filth carried down. (4th.) And in underground railways, the fires of the engines, and the saturation of air by the waste steam will render ventilation, in certain cases, necessary.

In a similar strain Mr. Butler proceeds to elucidate the practical *rationale* and details of ventilating arrangements and appliances, for which we refer the reader to the work itself.

The Prevention of Poverty, or Progressional Economy as a System of Natural Law, and Reform as a Science. By WILLIAM VOLCKMAN. London: Trübner and Co., 57 and 59, Ludgate-hill.

ALTHOUGH we do not care to fill our pages with political or even semi-political matter, yet the subjects Mr. Volckman deals with are of such wide-spread importance that we cannot help introducing his pamphlet to the notice of our readers, more especially as in his opening pages he gives a brief explanatory statement of his views, from which our readers will get a good idea of what they may expect to find in the work itself, which, being very cheap, everyone feeling an interest in the matter should get and read for himself. It appears from Mr. Volckman's statement that this essay was simply intended as the opening to an evening's debate at the London Dialectical Society, before which body it was read, on Wednesday, March 19th, 1873, under the title, "On money and interest:—On some of the elements, conditions, and infringements of well-being:—On politico-economic partnership." Its idea was suggested by a discussion at the Dialectical Society in the autumn of 1872,—but so far as it concerns such debate the paragraphs 124 to 131 in the work indicate.

Mr. Volckman adds: For its reproduced form, a more general title is adopted, and I have thrown into the illustrative chapters the remarks upon "money and interest" as subordinate to the larger subject. By way of partial amplification, however, such extra paragraphs have been included within the present outline as will serve to indicate the current of my ideas more clearly than was possible in a limited reading. The additional chapters are, for the most part, an extension of my notes for reply to the debate, many of which escaped utterance by reason of the restricted time.

In anticipation of a possible misapprehension, I urge that my paper is no attempt whatever at the advocacy of a "rhapsodical" "Arcadian" system of life, or, of any absurdly levelling scheme of wealth distribution and redistribution. On the contrary, it is one of my objects to show the needlessness of such views or schemes, and the sufficiency of natural economic law for a diversified well-being. Human society, I contend, is naturally and *de facto* a progressional and economical partnership; so endowed by birthright as to be well nigh secure against the possibility of poverty, if the natural conditions of its endowments be but properly understood and obeyed. Such "endowed partnership" (accident apart) is not only a provision of well-being for all, it is also the guarantee of that enlightened liberty and individuality so enjoyable to each, and so fruitful of general advancement. And the laws too of such partnership, being natural, find their highest expression, I also contend, in a developed, rather than in an initial civilization; dealing as they do with beings whose very nature is progressional. For the humanitarian economy herein exhibited I claim, in its entirety, its adaptability to present phases of society, altogether apart from recourse to projects of experimental socialism. As a corollary to the various positions assumed throughout, I assert reformation to be a science—the evolvement of which is sadly barred by a dangerous and impatient sectarianism.

Throughout the pamphlet the term "law" or "principle" is used in the experimental sense as denoting a deduction from an observed or invariable sequence of phenomena. When otherwise applied, the context sufficiently reveals the distinction. The word "State" or "Community" is variously employed, as signifying pluralities of individuals, up to and including the whole world. The more salient laws of progressional economy are printed in italic type, as being principles shown by experience to be ceaseless in activity, alway beneficial in harmonious action—but in their infringement invariably productive of calamity.

At some sacrifice to the movement of my remarks (and while maintaining their original form as a debate introduction) I have supplied "headings" to the various sections, for the purpose of bringing the sequence into prominence. I may plead this in some extenuation of crudeness, meanwhile directing attention to the arrangement adopted, which forms the scheme for a more matured and comprehensive work. Paragraphs 10 to 58 detail the natural laws of progressional economic partnership; paragraphs 59 to 80 consider natural economic law in biased action; paragraphs 81 to 102 deal with reform as a science; and the work concludes with several illustrative chapters.

We cannot afford space for a general review of Mr. Volckman's working out of the broad principles above enunciated; suffice it to say that Mr. Volckman is intelligent, earnest, and no bigot. However, we cannot refrain from making the following quotations, as we fully believe that the absorbtion of the political mind in questions of governmental forms and party shibboleths are merely red herrings drawn across the path of human progress:—

Republican agitation, says Mr. Volckman, as a reformatory procedure is at least unsequential, if not indefinite—is certainly raising a secondary issue. If it really proposes as its object developments of natural progressional economy (such, for instance, as "Land Redemption," or the "Capitalization of Labour"), why not avow such reforms primarily, leaving the subsequent question of "governmental mode" to take care of itself, as certain of sympathetic adjustment to every economic victory, and as insusceptible at any rate of a too precise anticipation.

Republicanism, it may be inferred from its assertiveness, assumes its method to be a fitting pioneer or developer of a sounder economy, social and political. But how will it prove that it is either on the one hand a fitting developer, or on the other a necessary outcome of economic harmony? Surely, if the past and present may speak, this is somewhat uncertain ground upon which to rest an agitation. For history proclaims that "governmental form" of every type (Republicanism included) has been put forward, or has operated, over and over again as a diversion from the profoundly real and tangible work before earnest reformers; the work, which if well done can never fail of developing its own true "form of government," whatever that may prove to be.

Citizens, while you are enthusiastically agitating this question of governmental mode, capital and labour are fighting over and over again their interminable quarrel, the land is further from your grasp, education is barely making a snail's progress, and pauperism is counting its millions. If you really wish for a weapon wherewith to secure the utmost of economic harmony; if you really desire to ascend the first step of reform, why not bring to lasting terms of peace the great middle and working classes? For what power could withstand such forces when united by a common interest for common objects; who, indeed, would dare deny to them whatever they might righteously ask? And such procedure is manifestly sequential and evolutionary, for of very necessity reformation springs from the soil, and from the root. Harmonious action there promises in due season the harvest you, indeed, are manfully seeking, but which your inverted husbandry cannot forestall, and may disastrously retard.

General Literature.

The Gateway to the Polynia. A Voyage to Spitzbergen. From the journal of John C. Wells, R.N., with numerous illustrations. London: Henry S. King and Co., 65, Cornhill, and 12, Paternoster-row. 1873.

Since M. de Lesseps, who, in despite of the notion that engineering enterprise was a British monopoly, planned and constructed the Suez Canal, the search for the North-West Passage to the East Indies has ceased to have the same practical interest that it formerly possessed; nevertheless, the scientific interest of such explorations as means of increasing cosmical knowledge is still as strong, if not so active, as in the days of our old Arctic navigators, and we quite agree with the author of this very pleasant and practical work, that "Arctic voyages have yielded good fruit in the past, and there is every prospect of greater gains accruing to science from the explorations of the future."

Although we deem this book to be one of interest to men of science, we shall here present it to our readers as a work which they may profitably take up with when light pleasant reading is their object rather than scientific study.

In the introductory chapter of the work, the author gives a brief history of the various Arctic voyages, which he commences with the statement that Columbus visited Iceland in 1474, and even sailed a hundred leagues beyond it. This history he closes with the remark that except at a few points we know very little respecting the seas and lands situate to the north of about 75°. The degree of flattening in the Polar region, and hence true form of the earth, can only be ascertained by the measurement of arcs in all latitudes, or by numerous pendulum observations. This is a point, the settlement of which is of considerable importance in physical science. Very little is known respecting the meteorology of the Polar region. After entering into the consideration of the fact that high temperature exists in this region in the summer, and a very low temperature in the winter, he justifies his assertion that science has much to gain from the prosecution of Arctic explorations when scientifically conducted.

This voyage in the Spitzbergen seas commenced thus:—The author received an invitation from a friend, casually given, to join him in two days' time at the port of Hull, from whence he intended to sail on a summer cruise to the far north, in his schooner-yacht, which left but little time to make the necessary arrangements for an undertaking of this kind. But the desire to see the wonders of Arctic enterprise, peculiarly interesting at the present time, when the question of Arctic exploration is before the world, rendered doubly important by the general enquiry into the action and influence of the Gulf Stream in high latitudes. All which considerations led to the invitation being accepted notwithstanding the shortness of time for preparation

The good ship leaves port and merrily proceeds on her voyage, the narrative of which is enlivened by recounting whaling exploits, encounters with icebergs, seal catching, bear hunting, sea perils, ice perils, graphic accounts of natural scenery of the grandest kind, often illustrated by engravings; and these, together with much pleasant reading as to the beasts, birds, and fishes to be found in the neighbourhood of the Northern Seas, form the staple matter of this book, which is a truly pleasant and instructive production, and one, though worthy of being resorted to by men of science generally, is yet singularly well adapted for presentation to an intelligent youth just entering upon manhood.

The Story of a Life, and Two Sequels. By William Alfred Gibbs. The Critics' Edition largely revised, and in part rewritten by the Author. London: Provost and Co., 36, Henrietta-street, Covent Garden. 1873.

Refreshing it is, in these days of rampant sensationalism, when crime and moral delinquency are staple themes for those who wish to be thought highly of as successful authors of works of imaginative literature, to meet with a poet like Mr. Gibbs, who delights in pourtraying things honest, and of good report, and does it well.

This "Story of a Life," though published to the world some time ago, and well received in accordance with its deserts, is worthy of being again and again brought under the notice of the public, for much may be found in it to be read with pleasure and profit.

As already intimated, it is no story of crime and passion, or the sense of vicious propensities falsely presented as unrestrainable human impulses. It is, in truth, a story of a life, the exact counterpart of that led by many hundreds of men and women in this country. But though not "sensational," as that term is now understood, it is not prosaic, nor devoid of passion and sentiment of that kind which all persons of correct taste would consider as soul-stirring and poetic in a high degree.

By the revision of the work Mr. Gibbs has not in any way injured the poem; on the contrary, he has greatly improved it.

The following extract, which refers to an aspect of every-day life that cannot fail to interest most men and women of our day especially at the present vacation season will serve to justify the statements we have made:—

How few in this mad age of feverish haste
Know aught of their own land, save that it hath
A score or two of central salient points,
Or bustling mimic "Londons" on the sea,
To which, and from which, they rush to and fro,
Half suffocate with smoke, foul smells, and dust,
Half stunned with hideous, harsh, incessant clank,
Whisked past fair valleys, towns, and villages,
Hurled into sulphurous darkness with wild yells
Of the ear-splitting whistle's sudden scream.
Then hustled out as the drear journey's end,
Shaken in body, feverish in mind,
Into a striving, struggling, seething mob
Of anxious, selfish, motley inhumanity.
Contrast this so-called pleasure-seeking
With the unhurried after-breakfast stroll,
The morning drive across the breezy hills,
Through undulating vales and shady woods,
By winding lanes, whose every gentle turn
Changes the landscape with a shifting scene,
Whilst various odours float upon the air
From hawthorn hedge, field blossoms, or fresh hay,
No harsher noises than the light swift wheels,
The ringing harness, and the horse's hoofs,
Which all combined drown not the lark's sweet song,
Nor scare the timid linnet from the bush.

Reviews of the following works are unavoidably postponed:—

"The Moon." By R. A. Proctor, B.A., Camb. Longmans.

"Mitchell's Manual of Practical Assaying." 4th edition. Edited by William Crookes, F.R.S., &c. Longmans.

"Sewage Utilization." By H. R. Burke. Spon.

"The Paradise of Birds" (poem). By J. W. Courthope. Blackwoods.

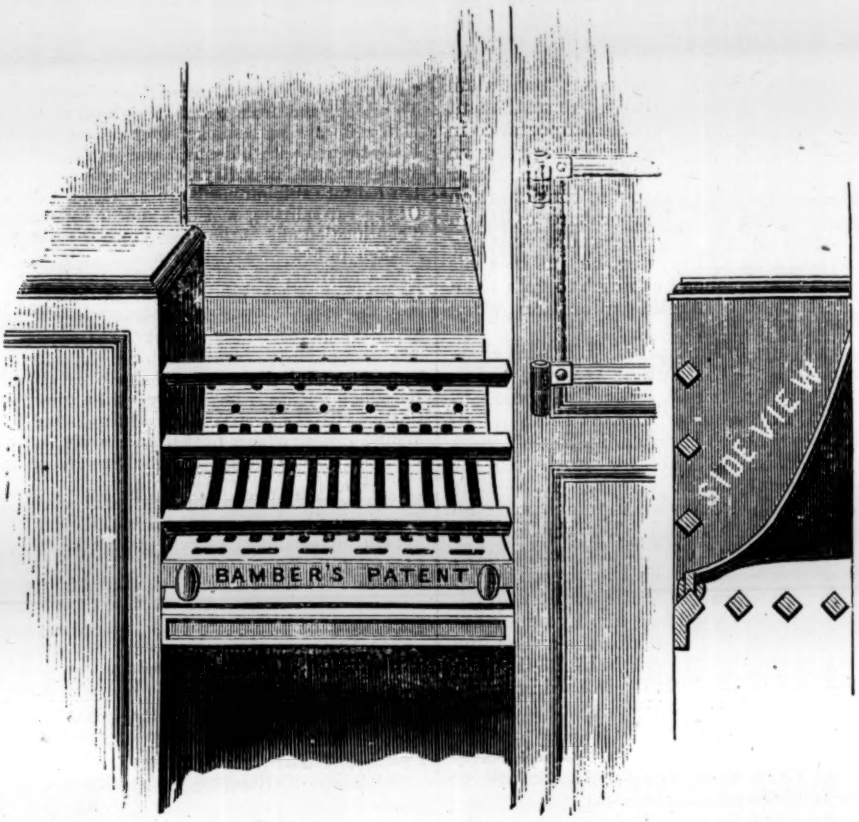
"Tales of the Sea." By Gooch. Author, Custom House.

"Principal Forbes and his Biographers." By John Tyndall. Longmans.

"Workshop Appliances." By C. B. Shelley, C.E. Longmans.

CENTRIFUGAL PUMPS.

A few months ago it was reported that Messrs. John and Henry Gwynne, of the Hammersmith Iron Works, Hammersmith, had commenced the construction of by far the largest set of centrifugal pumping machinery yet undertaken, this machinery being intended for employment on the reclamation of the Ferrara Marshes, in Northern Italy. The tract to be reclaimed extends over an area of nearly 200 square miles, and the work to be done by the pumps consists in raising a little over 2,000 tons of water per minute. The first pair of these pumps with their engines have just been completed. Quite apart from their exceptionally large size, these engines and pumps are, as respects design and workmanship, perfect models of their class, and some particulars of them will therefore be regarded with interest by numbers of our readers. It is a very simple matter to state that certain pumps have to raise 2,000 tons of water per minute, but it is more difficult to appreciate what such a performance really means; and we propose to state a few facts which will enable our readers to obtain a clear idea of the work to be done. Two thousand tons or 456,000 gallons per minute equals 656,640,000 gallons per day of 24 hours. According to the latest return, the total quantity of water supplied by the whole of the London water works is a little under 110,000,000 gallons per diem, so that it will be seen that the quantity of water to be dealt with by the Ferrara pumping machinery amounts to six times the whole metropolitan water supply. Again, 456,000 gallons, or 72,960 cubic feet per minute, would supply a stream over 103 ft. wide and 4 ft. deep running at a speed of two miles per hour, or 176 ft. per minute, while the delivery for a single day would also suffice to fill a reservoir a mile square to a depth of about 3 ft. 9 in.



BAMBER'S PATENT COAL ECONOMISER.

THIS Coal Economizer is an apparatus of the character illustrated by the engraving, which shews a kitchen-range with it applied thereto. An inspection of the side view (sectional) will clearly convey an idea of its construction, the white curved line showing section of the Economiser. This Economiser is adapted for kitchen-ranges, register, and sham register grates; being very simple, it can be easily applied. From being perforated, there is a continual current of air passing through the Economiser, which is at the back of the fire, hence the heat is thrown forward into the room instead of being carried up the chimney, as is the case with ordinary grates. It is stated that it will save half the coal, and give more heat than an ordinary fire. Many of the hotels in the neighbourhood of Accrington, Lancashire, have their kitchen tables fastened to the floor to prevent them being knocked over, and generally they are fixed facing the fire; and, it appears, that in several instances the paint upon them has been blisterd since the Economisers were introduced into the kitchen grate.

A very great advantage of this apparatus is that it is moveable. Snugs at the bottom of the Economiser enable it to be fitted upon any of the front bars of the fire-grate (see side view). The engraving shows the position for winter, but as summer advances it can be raised from bar to bar for two or three bars, when there will only be a handful of fire for cooking purposes. This not only saves the coal, but adds to the comfort of the household by regulating the temperature of the room. The annual consumption of coal for domestic purposes in Great Britain is computed to be over twenty million tons, but half that quantity would suffice if every household adopted economising apparatus. It appears the price for an ordinary cottage fire is from three to four shillings. Amongst the other merits of this invention it makes the fire-place present a clean and tidy appearance. The patentee and maker is R. Bamber, Accrington, Lancashire.

MR. MACFIE, M.P., ON PATENT LAWS.

THE following is Mr. Macfie's reply to the official invitation from Vienna to attend the International Conference on Patents for Inventions recently assembled in that city:—

House of Commons, 25th July, 1873.

Sir,—I have the honour to acknowledge your letter dated 21st inst., and I assure you I esteem highly the compliment of being specially invited to attend the Conference on Patents for Inventions, but I regret that I cannot accept this invitation. My engagements here and in Scotland are decisive.

I remember with pleasure conferences somewhat similiar, at which I had the honour to be present, at Dresden and at Ghent. At the former of these places a congress of political economists declared itself opposed on principle to the monopoly system of rewarding inventors. At the latter, in the Congress of the International Association for the Promotion of Social Sciences, a vote was unanimously passed, on the basis of a paper of mine, in favour of an international system of dealing with inventions. If I were to express my opinions at your conference they would be found in substantial fundamental accord with both of these resolutions; for I think it obviously beneficial to any country subjected to patents that other countries which are its competitors in trade and manufactures should be liable to the same burdens and restrictions, otherwise they gain an unfair advantage—their freedom from restrictions and prohibitions, their exemption from "royalty taxes" or duties to the holders of patent rights, acts in their behoof very much, and indeed with aggravation, as a protective or differential duty on the productions of the country that is their rival. Such is the character and effect of royalties exacted by patentees. (When royalties are not accepted and the monopoly enforced, the protectionism of the patent system becomes prohibitionism.) But I am quite prepared to advocate liberal treatment of inventors. If any inventor proves by his success that his new act is a valuable contribution to society, I would gladly see him honoured and made the recipient of a sum of money. Let there be an international committee of the several States of the civilised world constituted to make these acknowledgments. A comparatively small pecuniary contribution by each State would suffice. Assume it to be what you will, I doubt not it would put more money into the pockets of deserving inventors and adventurous manufacturers than the existing system of granting (too promiscuously and without such discrimination as to make it creditable to be a patentee) what we euphonistically call "exclusive privileges," *i.e.*, a more than royal power to forbid one's fellows for fourteen years to make or use processes, or machines, or knowledge, which the course of Providence opens to view and brings within reach. As to the people, on whom ultimately the burden of patents falls, they would be immensely advantaged by the exchange of the present mode of "purchasing" new methods and arts for the simple and natural one of direct pecuniary contributions, based on accurate estimates of their worth, formed on the incontestable proof of value established by experience and actual use. No one country probably would be assessed in order to provide as its quota £100,000. Will any expert calculate how much—in royalties, in enhanced prices, in retardation of improvements, and in various directions which I need not follow out—the present system costs? Whoever does so may expect to find the result, reducing it to money, will reach several millions. The British Government a few years ago appointed a commission, presided over by the present Earl of Derby, to inquire regarding patents. This commission indicated in its report that the question of the policy of granting patents deserves to be considered. Since then the Commons House of Parliament appointed a committee on the subject of patents, one of whose recommendations was that there should be introduced into the patent system the principle of internationalism, as well as compulsory licences (*i.e.*, abolition of the monopoly element in grants of patents). I call your special attention to the evidence given to that committee by M. Schneider. The eminent "tradesman" and statesman sanctions by his weighty opinion the idea that the obnoxious system might be continued if much more of formality and rarity conditioned its future. He would make patents quite exceptional favours, to be granted only in cases of special promise specially examined and adjudicated on. To this compromise few would loudly object. I hope the deliberations about to take place at Vienna will have mainly in view the welfare of society, allowing the interests of producers and consumers to predominate over the pretensions of ingenious contrivers who have hitherto, little to the advantage of many among themselves, been stimulated into unhealthy and destructive activity.

My friend Mr. Webster, Q.C., has kindly agreed to carry for you twenty copies of a compilation I made three years ago of arguments *pro* but chiefly *contra* patents as hitherto administered. Will you do me the honour to accept and circulate these?

I am confident that your conference will mark and institute an epoch, if it eventuate in arrangements such as will be found imperfectly sketched in this volume.

Again expressing the disappointment I feel at not being a sharer in your consultations, but anticipating therefrom such propositions as the British Government (in which a judgment adverse to patents begins to prevail, on the Woolsack, in the War Office, at the Treasury, and elsewhere) may hail as a practical steps towards solution of a great question hitherto not grappled with, and indeed barely considered as to its principle in most States of the civilised world,—I have the honour to be, Sir, your faithful, humble servant, R. A. MACFIE.

We learn that our friend and fellow-member of the Inventors' Institute, Mr. J. R. Cressey, is candidate for the office of engineer, &c., to Dartmoor Prison. We trust he will be successful, as he deserves to be.

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Editor's Office: 21, *Cockspur Street, Charing Cross, S.W.*

THE INVENTORS' INSTITUTE,

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ESTABLISHED 1ST MAY, 1862.

Past Presidents:

SIR DAVID BREWSTER, K.H., LL.D., F.R.S., &c., from the establishment of the INVENTORS' INSTITUTE, till his decease, February, 1868.

LORD RICHARD GROSVENOR, M.P.

Chairman of the Council:

SIR ANTONIO BRADY.

NOTICES.

TO MEMBERS OF COUNCIL.

A meeting of the Council will take place on Thursday, September 4th, at 7 o'clock.

At the Office of "The Scientific and Literary Review, 21, Cockspur Street.

All Subscriptions should be paid to Mr. G. A. STRETTON, the Receiver, 4, St. Martin's-place, S.W.

Proceedings of the Institute.

A meeting of the *Council* (ordinary) of the Inventors' Institute was held on the 14th August at the Office of the SCIENTIFIC and LITERARY REVIEW, 21, Cockspur-street, S.W., Mr. F. H. Varley, chairman of the Ordinary Council, presiding. A Report by Dr. R. H. Collyer, hon. Commissioner of the Inventors' Institute to the International Patent Congress at Vienna, was read. This Report was ordered to be printed and published. (See Report as printed in the present number of the SCIENTIFIC and LITERARY REVIEW.)

After this Mr. Carttar moved, "That the important questions raised by the results of the recent Congress at Vienna, render it probable that the patent laws will be much discussed at the forthcoming meetings of the British Association and the Social Science Congress; therefore it is desirable that a representative be sent by this Institute to those assemblies."

This was seconded by Mr. Murray, and carried unanimously.

It was also resolved, "That Mr. F. H. Varley and Mr. A. J. Murray be requested to attend the British Association as hon. Commissioners."

It was likewise resolved, "That Mr. Stretton, the receiver, be requested to take measures for supplying all paying members with official receipts."

It was also resolved, "That early payment be solicited from all members who have not paid up their subscriptions, and that Mr. Carttar (the Auditor) and the Secretary be specially charged with carrying out this resolution."

The following gentlemen admitted as,—were ordered to be placed on the List of,—Members, viz.:—Messrs. A. Sweet, Sofus E. Holten, J. Rochford, M.E., W. Mitchell, Jno. Robinson.

Monthly Notices.

The Tribunal of Commerce movement is, we are glad to say, still progressing; although, the present being no time for public meetings, no demonstration is on the *tapis*, but Mr. Francis Lyne, who might not be inaptly termed the father of the movement, has recently published a pamphlet treating the subject historically and suggestively.

As Dr. Joule, of Manchester, the President-elect of the British Association, will, unfortunately, be unable to preside at the forthcoming meeting owing to ill-health, Dr. A. W. Williamson, of University College, has been elected to the office, and will assume the presidency at Bradford.

L'Institut, for the 9th July, prints copious extracts from a note by M. M. P. Gervais, "Sur les Ossements Fossiles de Mammifères trouvés jusqu'à ce jour dans les Différentes Parties de l'Italie." In the same journal, for the 16th July, will be found a curious and instructive paper on anthropology, read by M. de Bischoff before the Academy of Sciences of Munich.

M. P. Gervais publishes, in his own *Journal de Zoologie*, a paper, describing the animal remains which have been brought to light by M. E. Piette, during his exploration of the bone-cavern of Gourdan in the Haute-Garonne. These remains consisted chiefly of the bones of the reindeer broken by man, and associated with the bones of a few other mammals, and of certain birds and fish. The cave has also yielded a curious collection of designs engraved on bone, by men of the reindeer period. One of the most interesting of these rude engravings is a figure representing a species of antelope, supposed by Gervais to be the Saiga, or *Antilope Tartarica*.

In *Les Mondes*, for the 10th of July, will be found an interesting contribution by M. Le Comte Marschall, à Vienne, "On Practical and Theoretical Science in Austria." This journal, for the 17th of July, is of an unusually miscellaneous character, but, nevertheless, interesting.

The Academy of Sciences of France, at the *Séance* for July 7th, proceeds to elect a correspondent for the Section of Anatomy and Zoology, to replace Prof. Agassiz, elected "*Associe Etranger*;" M. Steenstrup, obtaining a majority of thirty votes over Mr. Darwin, was chosen;—to replace M. Pictet, Prof. Dana was elected; and to replace M. Pouchet, Dr. Carpenter, who obtained thirty-five "suffrages," Mr. Darwin obtaining twelve, and Mr. Huxley, one.

The *Comtes Rendus*, for July 7th, contains two papers on solar physics, "Sur la Constitution du Soleil et la Theorie des Taches," by M. E. Vicaire, and "Les Cyclones du Soleil comparés à ceux de notre Atmosphere," by M. H. Tarry. They are both of considerable interest.

The German African Expedition, which was wrecked on the coast north of the Congo River, has returned to Sierra Leone. Although most of the instruments were lost, the expedition intends to proceed to Congo, where it expects to meet Dr. Bastian, the late President of the Berlin Geographical Society.

On the banks of the Coorong, about six miles north of Salt Creek, South Australia, a remarkable petroleum district has been opened out. The country is said to be saturated with mineral oil, and, around a shallow lake, a strange deposit is found spread out upon the sand, which, from its resemblance to india-rubber, has been called in Australia "caoutchouc," which yields upon distillation both gas and oil in large quantities. This peculiar substance, which has received in this country the provisional name of "coorongite," has been thought by some to be an elastic bitumen, and by others to be the mycelium of a fungus. Mr. T. U. Scrutton has, according to the *South Australian Register* of May 20th, lately returned from the Coorong, and he reports most favourably of the locality, not only for mineral oil, but for coal.

The well-known comet discoverer, Tempel, on July 3, discovered a new telescopic comet, which has been found by Herr Schulhof, of the Vienna Observatory, and by Mr. Hind, to be moving in an elliptic orbit with a period somewhere less than six years. According to Schulhof's ephemeris, it is now at its nearest distance from the earth, about eighty millions of miles, but has passed its perihelion, and is diminishing in apparent brightness. The news of its discovery was immediately sent to America by Atlantic Cable, and it was observed on July 5, at Clinton, N.Y., by Prof. C. H. F. Peters.

Amongst works recently published—which, although not suitable for regular review in our pages, are nevertheless of a character likely to interest many of our readers—are the "Life and Letters of James David Forbes, F.R.S. By J. C. Shairp, P. G. Tait, and A. Adams-Reilly. (Macmillan and Co.), and "The Eruption of Vesuvius in 1872. By Prof. Luigi Palmieri, with Notes by R. Mallet (Asher and Co). In the first of these works three authors give us the several distinct aspects in Forbes's life and work. "There was his work as a scientific investigator and discoverer; his work as an Alpine explorer, and, as far as Britain is concerned, the father of Alpine adventure; his work as a professor and a university reformer; lastly, his character as a man." It appears that Forbes, when only seventeen years old, sent, anonymously, a paper to Sir David Brewster, the late lamented President of the Inventors' Institute, which won his attention, opened to the youth the pages of the *Philosophical Journal*, and, shortly, led to a correspondence which lasted for several years, and no doubt did much to forward Prof. Forbes's position in the world of science. In Professor Palmieri's work on the "Eruption of Vesuvius, 1872," Mr. Mallet seeks to prove the weakness of the chemical theory first advanced by Davy, and afterwards advocated by Dr. Daubeny, and of the rival mechanical theory; and, in their stead, and upon an experimental basis, that all the phenomena of elevation, of volcanic action, and of earthquakes, are explicable as parts of one simple machinery, namely, the play of forces resulting from the secular cooling of our globe. As the globe solidified by cooling, the thin crust at first formed contracted more rapidly than the still liquid interior, and "tangential tensions" were brought into play, whereby the crust would be broken into fragments. As the process of cooling advanced, the contraction of the interior proceeded at a rate greater than that of the thickening shell, and, consequently, "the signs of the tangential forces" were changed. The tensions became pressures, the resolved vertical components of which are competent to produce elevations and depressions at the earth's surface. Mr. Mallet considers it possible that these vertical components may, even now, be working changes in the heights of mountain chains. Prof. Palmieri notes as a phenomenon never before observed, singular explosions or external eruptions, which occurred in the body of the lava streams themselves. He considers these shew a power in the lava to form eruptive famaroles. These external eruptions ended without producing cones or craters; or at any rate, such, if formed, were swept away by the lava current. On the chemistry of the volcanic ejectamenta, the author finds that lead chloride (alone or associated with other metallic chlorides) is a constant ingredient of the sublimates from the fumaroles of lava. Calcic chloride also has been observed in considerable quantity.

The return of thirty artisans sent out by the Society for the Promotion of Scientific Industry, to report upon their respective trades as exhibited at the Vienna Exhibition, is announced. A volume of Reports is to be issued shortly. The expenses of eleven Birmingham men were defrayed by the Birmingham Chamber of Commerce.

Sir Charles Wheatstone has received from the French Society for the Encouragement of National Industry the great medal of Ampere, which is awarded every sixth year for the most important application of science to industry. The former awards have been made to De Lesseps, the engineer of the Suez Canal; to Boussingault, for his researches on agriculture; and to H. Ste.-Claire Deville, for his process for manufacturing aluminium. Sir C. Wheatstone receives the medal for his varied applications of electricity.

Dr. C. W. Siemens's lecture "On Smelting Iron and Steel," delivered last March, before the Fellows of the Chemical Society, is published, with illustrations, in the July number of the Society's Journal.

The *Comtes Rendus*, for June 30, prints an interesting paper, communicated to the Académie des Sciences by M. Dufour, "On the Reflection of Solar Heat at the Surface of Lake Leman," which applies to the reflection of the sun's heat from the surface of the sea, and explains the often observed phenomenon of the scorching power of such reflected heat under certain conditions.

M. Tacchini also communicates some observations which appear to him to prove the existence of magnesium in the border of the sun; having, as he thinks, some relation to the number of protuberances.

Another essay on the late eruption of Vesuvius, entitled "Der Vesuv im April, 872," has issued from the pen of Herr Heim, of Zurich, who happened to visit Vesuvius at the time of the eruption. A German edition of Palmieri's monograph has been brought out under Prof. Rammelsberg's care.

The Fish Commissioner of the United States has transported from the Eastern waters to those of the West, across the American continent, a large number of living fish, in a car specially fitted for their transportation with tanks, so shaped that the water could not escape under any amount of shaking. Eleven varieties of fish, natives of the Atlantic, were thus removed to the coasts of California, with a view to the naturalization in the Pacific Ocean.

Prof. Schearer, of the Mining Academy of Freiberg, recommends, for the removal of phosphorus from pig iron during the puddling process, that chlorides of calcium and sodium in equal parts be fused together. This mixture is introduced into the puddling furnace in the proportions of about three times as much as the phosphorus contained in the iron. The phosphorus and the chlorides combine and it is removed in the slag.

The varying expansion of the F hydrogen line, under ordinary atmospheric pressure and the increased pressures of the atmospheres of the sun and Sirius, has been employed by Mr. J. J. Lake to obtain a proximate idea of the mass of Sirius, which he estimates cannot be less than twice that of the sun.

M. Janssen's method for photographing the apparent contact of Venus with the edge of the sun is worthy of description. The photographic plate is in the form of a disc, fixed upon a plate which rotates upon an axis parallel to that of the telescope. Before it is placed another disc, forming a screen, in which is a small aperture, in order to limit the photographic action to the edge of the sun. The plate which carries the sensitive disc has 180 teeth, and is placed in communication with an escapement apparatus actuated by an electric current. At each second the pendulum of a clock interprets the current, and the plate turns one tooth, so that at each second a fresh portion of the photographic plate is exposed. Thus, in as many seconds, 180 images of the sun and the planet can be obtained. When the series relating to the first contact is obtained, the plate is withdrawn and another substituted, which gives the second contact, and so on for the four.

MITCHELL'S PATENT SMITHY HEARTHS FOR GENERATING STEAM.

THIS invention consists in fixing the fire inside a boiler flue, similar to a Cornish boiler, with sliding doors, so that the smith can close all up and prevent, as much as possible, of the cold air from rushing in during the time he is heating the iron. When the flame has passed to the opposite end, it is then conveyed round outside the boiler, similar to an ordinary steam boiler; the steam is of course conveyed to the engine or other boiler, or used to drive a steam hammer. Or the furnace of a vertical boiler can be made use of, to form the smithy fire, when constructed for the purpose without fire bars. In each case the tuyere iron must come through the side of the boiler to a suitable position, to convey the blast to the fire when resting in the bottom of the flue. When the blast passes through 1½ in. tuyeres, and is used in the ordinary way, I calculate that as much steam could be raised as would on an average supply a 6 in. steam cylinder at 70 lbs. pressure. Where a number of these hearths are connected together, the supply of steam would be much more uniform, than where one or two only are required. Pipes containing water are also used if desired.

Further particulars and terms may be had by applying to the patentee, W. Mitchell, Strand-street Works, New Islington, Manchester.

AFRICAN EXPLORATION.

WE learn from the *Times* that Sir H. C. Rawlinson has received a letter from Sir Samuel Baker, dated 2nd July, 1873. In it he states that he found the Bahr-Giraffe completely changed, thanks to the great labour he bestowed upon the work in 1871, its canals having turned into permanent channels of deep water, and the force of the stream having cleared away its sandy shallows, so that his twin-screw steamer of 108 tons passed through without any difficulty. He says there are now eleven steamers on the White Nile, and with honest cruising no slaver could escape. Sir S. Baker, adds, "The news of Livingstone's safety is most cheering," but says, "I am astonished at his account of an examination of the north end of Tanganyika that there does not appear to be any connection with the Albert Nyanza. Since I wrote to Sir Roderick (Murchison) the King of Uganda, M'tése, to whom I had intrusted the search for Livingstone, sent messengers to me at Faliko, saying that his men had been to Ujiji, and declared that Livingstone had left that place long before for the west side of Tanganyika, since which nothing was known of him. They also reported that three white men had been to Ujiji, but had returned. I wrote a letter to Livingstone which will certainly reach him if he comes north, and the King of Uganda will receive him kindly, and forward him to the Government station."

Another communication from Sir S. Baker, addressed to his brother, conveying similar information, has also been published.

The death is announced of Sir Francis Ronalds, F.R.S., formerly director of the Observatory at Kew. Sir Francis was well known for his labours in the advancement of electrical science and its practical applications. He was in the eighty-sixth year of his age.

Proceedings of Societies.

VICTORIA (PHILOSOPHICAL) INSTITUTE.

At a recent meeting of this Institute, Mr. C. Brooke, F.R.S., in the chair, the Rev. Dr. Ross, Colonel Drayson, R.A., and several other members were elected, and donations to the Library announced. Among the letters read was one from the Right Hon. W. E. Gladstone, expressing the great interest with which he had read the proof copy of Professor Kirk's paper on "Force;" which paper was then read by the author, who had prepared it with the special object of supplying a concise and popular essay upon the present aspect of a subject which had been made the question of the day. Professor Kirk began with a criticism of the more common definitions of force, and proceeded to treat of it as a true phenomenon, arguing that every reality which reveals itself as existent must be so regarded. His aim was to reach the conceptions of movement in its origin, or of that in virtue of which motion, in every instance, has its beginning. The doctrine of molecules possessing force was discussed at length, and the molecular theory generally disputed. The correlations of strictly material affections, and also the correlations of mental affections were stated; but the correlations of material with mental affections denied. Professor Kirk argued that an impossible limit separated mind from matter, so that while their several affections were related they are never correlated—that is, they never passed into another, as material affections pass into material, and mental into mental. The result of this paper went to show that true force is that capacity of mind in virtue of which it produces motion. Force, energy, and all kindred terms, when applied to matter could truthfully mean motion only, and if accounted for, must be so by reference to force-originating mind. An animated discussion followed the reading of the paper.

At the last monthly meeting of the council of this institute, held at the rooms, 8, Adelphi-terrace, sixteen additional members were elected. It was announced that seventy-nine new members had joined during the past seven months, and the fourth issue of the People's Edition of the Annual Address had taken place. It was also reported that in accordance with a resolution passed at the previous meeting the institute had joined in the application made to the Government for adequate aid to the expeditions to observe the transit of Venus, more especially those so strongly urged by the Greenwich board.

INSTITUTION OF NAVAL ARCHITECTS.

The following gentlemen have recently been admitted Associates of this Institution:—Lord Henry George Gordon Lennox, M.P.; M. Charles Antoine, of Brest; Mr. C. P. Bailey, and Mr. J. Black, of the Constructor's Department, Admiralty; Mr. G. J. Cole, Earle's Shipbuilding and Engineering Company; Mr. George Duncan, Shipowner; Mr. Thomas Edwards, Constructor's Department, Admiralty; Mr. Alfred Elgar, of Mr. E. J. Reed's staff; Mr. John C. Kafer, Engineer, U.S. Navy; Mr. John Littlejohn; Commander W. B. McHardy, R.N.; Mr. Thomas Phillips and Mr. Frank Proctor, of the Constructor's Department, Admiralty; Professor J. M. Rice, U.S. Navy; Messrs. J. Richards and G. J. Rickard, of Mr. Reed's staff; Mr. R. E. Shill, C.E.; Mr. John Smith, of Messrs. Smith, Pender and Co., Millwall; and Captain Philip Syvret.

Correspondence.

COMPULSORY PATENT LICENSES.

To the Editor of the Scientific and Literary Review.

Sir,—From the report of the proceedings of the International Patent Congress, sitting at Vienna, it appears that the sixth resolution proposed is to the effect, "That inventors should be required to allow their inventions to be used by other parties on payment of suitable remuneration." This is a proposition on the part of manufacturers inimical to the interests of patentees and the public.

Finding the idea of abolishing patents untenable, this proposition is next insidiously introduced to effect the same thing. It is the same idea disguised under a different garb. Its object is to disarm patents of their power to injure the trade monopolies which manufacturers at present possess, and remove the only impediments which obstruct the formation of one vast combined monopoly in manufacture. The only opposition and competition in trade with which manufacturers have now to contend is that arising from patented improvements in manufacture.

Under such a proposed law patentees would have to incur the expenses and risks of proving the value of their inventions, and in the event of their turning out to be of great value, then to be deprived of the profits to be derived from practically carrying them out and establishing lucrative businesses through their means, by which the real value of patents would be destroyed. Great risks will never be undertaken except under expectations of extraordinary gains. By this covert and unfair suggestion the risk of failure would fall upon patentees, while manufacturers would profit by their successes. Factories for the manufacture of articles of merchandise are speculations of an entirely different character to those trading establishments devoted to dealing in their products. Merchants and traders deal in that which manufacturers produce, and, could a combination be formed amongst the general body of manufacturers, it would possess absolute control over the market prices of these articles of trade. The consequences resulting from such a state of things are fully exemplified in the present coal monopoly. Now the most effectual and only competition which manufacturers experience at present is that which springs from new factories established upon patented inventions of improvements in manufacture.

The implied condition of patents is that the inventions protected by them are of public utility. This utility is attained either by reducing the cost of manufacture, and consequently the market prices of its products, or by improving those products, or by producing something entirely new, or in some way or other accomplishing advantages beneficial to the public. These are the elements which give potency to trade competition created by patents in opposition to manufacturers, who would, but for such opposition, form a wealthy and powerful manufacturing monopoly. To give old established manufacturers, who possess unlimited wealth and world-wide trade connections, the same intellectual advantages as those possessed by inventors would effectually debar inventors, whatever might be the value of their inventions, from attempting to commence, or of even entertaining a thought of commencing, new factories upon the faith of patents in the face of such overwhelming oppositions. By combining unbounded wealth with all the inventive talent of the nation (the natural sequence of the proposed law) could only result, as before said, in the formation of one powerful monopoly in the manufacture.

To destroy the temporary and beneficial monopolies in patents would be *ipso facto* to create one of a permanent and highly pernicious character. This would be a public calamity, and one which would seriously affect the future welfare and stability of this Empire.

The suggestion is not only presumptuous, it is an attempted violation of the legitimate rights of property which can only be met by independent patentees by a decided protest.

Besides uniformity, simplicity and comprehensiveness in any code of International Patent Law, it is absolutely necessary that the system shall provide a prompt and summary process of a criminal nature to punish any wilful infractions of titles in such property. The notorious and scandalous administration of the patent laws may almost be said to be the only source of complaint which can be made against the patent laws of this country.—Yours, obediently,

A. J. Murray.

181, Albany-road, Camberwell,
August 9, 1873.

ABSTRACT OF PROPOSED INVENTION RIGHT BILL.

BILL PUBLISHED IN "SCIENTIFIC REVIEW" FOR JULY, 1871.

I. A chief commissioner (barrister) and six commissioners (technical scientifics) to form Patent Commission.

II. Chief commissioner to have the powers of a judge of the superior courts, and may hold a court with like powers.

III. The commissioners under Act of 1852 superseded.

IV., V., VI. Provisions as to building offices, clerks, &c.

VII. Chief commissioner to make rules to come into operation fourteen days after laid before Parliament.

VIII. Seal of office provided for.

IX. *Certificates of invention right* to be issued by the chief commissioner, which shall confer for *twenty-one years* the same rights and privileges as the present letters patent.

X. Invention may be publicly recorded without charge when inventor gives it free to the public.

XI. *Application* for a certificate of invention-right to be by declaration, and lodgment of a specification. Both to be registered.

XII. The invention may, after registry of application, during six months, be used and published, yet subsequent certificate to be valid.

XIII. *Amendments*, for four months after application of the specification may be made on payment of fees, subject to the approval of the investigating commissioner as being consistent with the original specification, and not interfering with the rights of others.

XIV. Fraudulent application, or any publication subsequent thereto, shall not invalidate the certificate granted to the real inventor.

XV. Advertising of applications provided for.

XVI. *Notices to proceed* to be given within four months after applications, same to be advertised, and objections to be allowed to be entered.

XVII. *Investigation* by a commissioner after notice to proceed, who is to report to chief commissioner.

XVIII. The investigation by the commissioner to proceed on comparison of the specification with opponent's descriptive statement, and *viva voce* evidence not to be received unless explanations are required.

XIX. Chief commissioner, after receiving the investigating commissioner's report, to investigate all matters relating to the application for certificate of invention right (except questions as to merit or utility of invention). Counsel to be allowed to be heard, but the cost attending their employment not to be allowed, unless the chief commissioner so decide. Chief commissioner to decide the case as may be just and right.

XX. *If applicant persist in demanding a certificate of invention right, notwithstanding the objections of the commissioners*; certificate to issue; objections to be recorded. But no certificate to be issued when the chief commissioner decides in favour of objections made by others than the commissioners.

XXI. Validity of certificate of invention right after grant and before the confirmation, (provided for in the Act) may on demand be enquired into and adjudicated on.

XXII. No certificate of invention right to be rendered invalid on the plea of insufficiency of subject-matter merely.

XXIII. On adjudicating on the validity of a certificate, the chief commissioner may order it to be *cancelled*; but any person deeming himself aggrieved by such a decision may appeal to the House of Lords.

XXIV. Mode of determining and recovering the costs of an enquiry.

XXV. Patentees may surrender patents.

XXVI., XXVII. Specifications, amendments, abridgments, indexes, &c., be published.

XXVIII. "Register of invention rights;" and XXIX., registration of proprietors provided for.

XXX. *Confirmations* of invention rights may take place *after the end of two* years and before the end of *three*. Applications for confirmations shall be advertised, and objections to such confirmations may be made within one month.

XXXI. Court for confirmation to consist of the chief commissioner and two other commissioners conversant with the particular subject-matter question. After due hearing decision as to confirmation to be given.

XXXII. *Indefeasible patent* after confirmation.

XXXIII. If confirmation be decreed, sealed certificate to be given, which shall be valid to the end of the 21st year from the date of application for certificate.

XXXIV. Fees to be paid at the end of every third year.

XXXV. Such fees are to be paid into the exchequer as part of the consolidated fund.

XXXVI. Parties guilty of infringment to be cited before the chief commissioner, who shall hold courts of inquiry for the purpose.

XXXVII. A list of engineers, chemists, and others qualified to be select jurymen shall be kept; remuneration they are to receive to be regulated by the chief commissioner. Cases of infringement to be tried with five of these, or, if the parties desire it, with a common jury; provisions as to the proceedings of such courts.

XXXVIII. Official inspectors of infringements may be appointed.

XXXIX. Before confirmation of certificate, defendants in cases of infringement may plead against the validity of the invention right, want of novelty, prior use, or any other issues; but after confirmation only non-infringement.

XL. *Disclaimers* before confirmation may be entered.

XLI. Forms given in schedules to be annexed to Act to be used; but they may be varied by chief commissioner when occasion requires it.

XLII. Any person may apply to have an entry in the register of proprietors, by which he deems himself aggrieved, expunged, vacated, or varied; and chief commissioner may make an order to that effect, and also with reference to costs.

XLIII. The making a false entry in the register of proprietors, or forging a writing purporting to be the copy of any entry in said register, or tendering the same in evidence, to be a misdemeanour.

XLIV. Account of salaries, &c., to be laid before Parliament.

XLV. No certificate of invention right to prevent the use of an invention in any foreign ship or vessel.

XLVI. Certificate of invention right, for an invention patented in a foreign country, shall become void when the foreign patent expires.

XLVII. If the applicant for a certificate of invention right die before it is issued it may be issued to his representatives.

XLVIII. Lost certificate may be replaced by a duplicate.

XLIX. Within three months after any decision on any matter is given by the chief commissioner either party may appeal to the House of Lords.

L. Existing patents may, under certain conditions, be changed into a certificate of invention right.

LI. No money paid for royalty or otherwise shall be recoverable if certificate is cancelled.

LII. Chief commissioner may make an order for an injunction, inspection, or account.

LIII. Taxation of costs.

LIV. Allowances to persons holding appointments under the present patent laws.

LV. Interpretation clause.

LVI. No evidence shall be taken regarding anything affecting the validity of a certificate of invention right if it occurred more than fifty years before the date of said certificate.

LVII. This Act to be cited as "The Invention Right Act," and to take effect from—

LVIII. Time of commencement of Act; schedule of fees.

THE TRANSIT OF VENUS.

An able article on the discussions regarding the approaching Transit of Venus appeared in the recent number of the *Edinburgh Review*. Mr. Proctor has published some remarks upon it in the *Times*, which will scarcely, we think, be generally assented to by those who "can render a reason" for their opinions. He draws a somewhat amusing picture of an assumed understood (not expressed) compact amongst civilized nations, according to which England was to perform a certain part in the said Transit, and then laments that she has failed to act according to her proper position in this scheme. We believe, however, that the arrangements made will in all probability secure us a set of observations which, with the aid of those contributed by other nations, particularly the Russians, will fully and satisfactorily enable us to solve the noble problem (as it has been justly called) of the Sun's distance. These arrangements now include a commission to the *Challenger*, already engaged in scientific work, and therefore well equipped for such a purpose, to supplement her present labours by exploring some of the islands to the south-east of Kerguelen's Land, with the view of ascertaining whether there is any place at which a landing may be effected, and additional observations made for the application of Halley's method. No stone will therefore be left unturned for the efficient observation of the Transit in every practicable method. The Germans appear to place great reliance upon direct observations with the heliometer, and their well-considered plans for the use of this method deserve to be rewarded by successful results. Photography will also be extensively drawn into the service. The Americans in particular propose making great use of it; others also are to employ it, amongst them Dr. P. Kaiser, son of the late eminent Director of the Leyden Observatory, is to take charge of a Dutch expedition to Japan.—*Athenæum*.

Mr. Rowland's Weather Forecasts.—A preliminary meeting was recently held at the chambers of Mr. J. R. Taylor, Weaver's-hall, for the purpose of hearing an address from Mr. Owen Rowland, on his improved system of weather forecasts, at which there were present Sir A. Brady, Mr. W. Darley, one of the Board of Trade assessors, Mr. J. R. Taylor, Mr. J. R. Rowland, and others.

(Official Regulations.)

LONDON INTERNATIONAL EXHIBITION OF 1874.

Division II. Classes 8 to 13.

Manufactures.—Regulations for exhibiting manufactures, with the raw produce, machinery and processes employed.

(Rules extracted from the Directory.)

43. In 1874, Division II. of the Exhibition will consist of the following classes :—

Class 8. Lace (hand and machine made).
Class 9. Civil Engineering, Architectural and Building Contrivances.
  a. Civil Engineering, Architectural and Building Contrivances.
  b. Sanitary Apparatus and Constructions.
  c. Cement and Plaster Work, etc.
Class 10. Heating by all methods and kinds of fuel.
Class 11. Leather, including Saddlery and Harness.
  a. Leather, and Manufactures of Leather.
  b. Saddlery, Harness, &c.
Class 12. Bookbinding.
Class 13. Foreign Wines, in the Vaults of the Royal Albert Hall.

Under Division II. (Manufactures) will be exhibited selected specimens of the finished manufacture, as well as the raw material of the fabric in its different stages of production, and the machinery and processes employed in its manufacture.

44. All industrial objects submitted for exhibition should be limited to such specimens as are necessary to show the manufacture and patterns in a satisfactory manner. No mere duplicates can be admitted; the same design in a fabric may, however, be shown with different combinations of colours.

45. With the view of increasing the educational value of the Exhibition, by chronicling the progress of manufactures, Her Majesty's Commissioners will reserve certain spaces in the industrial division for special collections of ancient works.

46. In the case of industrial productions, the special reasons (such as excellence, novelty, cheapness, etc.) why it is exhibited should be stated, and, whenever possible, the average retail price at which it can be bought.

47. Exhibitors of machinery must construct all necessary foundations, and provide their own driving-belts and driving-pulleys, which are to be in halves, and bored to the proper diameter of the main shafting, as notified to them by Her Majesty's Commissioners. They must also supply and erect, at their own expense, any counter-shafting (including the necessary foundations) which they may consider requisite to increase or reduce the speed to suit their own particular machines.

48. In order that exhibitors of machinery and processes may recoup the cost of the operations illustrated, they will be permitted to sell to visitors such results of the operations as are actually manufactured within the Exhibition building, on condition of the payment of a moderate royalty, based upon a head-money payment on the total number of visitors to the Exhibition.

49. The following information should be supplied, with the form of preliminary application (No. 10), by proposing exhibitors of machinery (Form No. 10*a*).

a. A plan of each machine, showing the position of driven-pulleys, the minimum space required for attendants, and indicating the parts of the machine which should be placed most prominently for inspection by the public. An elevation would also be of use, if it could be supplied without inconvenience.

b. A plan and section of the foundations required.
c. The weight of the machine.
d. The amount of motive power, in actual horse-power, required from main shafting.
e. Should water, steam, or gas be required, all necessary information as to the quantities of the requisite supplies, which must be paid for by the Exhibitor.

50. Exhibitors must make their own connections for gas, water, and steam. They must also provide and attach meters of sufficient capacity to measure the quantities of gas or water which they may consume, and for which they must pay monthly to Her Majesty's Commissioners, at the rates actually charged at the time by the companies.

57. The latest days appointed for receiving the different classes of goods are as follows:—

Tuesday, 10th February, Specimens of Ancient Lace.

Monday, 17th (? 16th) February, Class 10. Heating by all Methods.

Wednesday, 4th March, Machinery of all Classes.

Thursday, 5th March, Class 9. Civil Engineering, Architectural and Building Contrivances.

Friday, 6th March, Class 11. Leather, Saddlery, and Harness.

Saturday, 7th March, Class 12. Bookbinding.

Tuesday, 17th March, Class 8. Machine-made and Modern Lace.

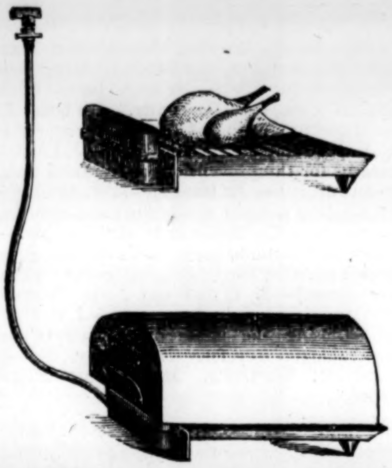
Foreign Wines (Class 13) must be delivered punctually on the days which will be announced hereafter.

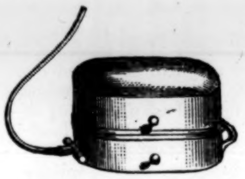
58. Exhibitors in Class 9 who may wish to show new methods of construction in actual operation, during the Exhibition, will (with the Committee's approval) be allotted space in the West Annexe, wherein to build or to erect their plant, etc., in view of the visitors to the Exhibition,

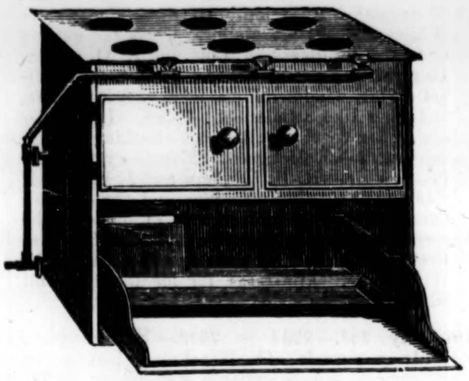
7. Applications to submit objects, proposed for Exhibition, to the Official Committees of Selection, should be made on the Form of Preliminary Application (No. 10), which can be obtained at the Offices, 5, Upper Kensington Gore, London, S.W., and should be forwarded to the Secretary before the 1st January, 1874.

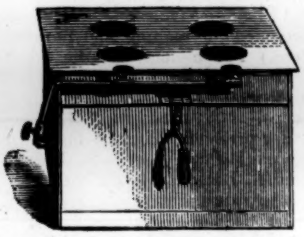
The London Exhibition of 1874, and City Guilds.—The commissioners having decided that civil engineering and building are to be prominently represented at the exhibition of 1874, have invited the Tylers and Bricklayers' Company to nominate three of their members to serve on a committee of advice and selection for this class; and the court of the company have selected Mr. R. Moreland, Mr. John Young, and Mr. John Bird for this purpose.

A Cooling and Cheap Summer Drink.—Dr. Walter Lewis has prepared an excellent orangeade for the use of the clerks and messengers in St Martin's-le-Grand, and as a precaution against cholera the Registrar-General strongly recommends it for general adoption. Here is the prescription:—Sulphuric orangeade useful in cholera times. Concentrated compound infusion of orange peel, 3 ounces; simple syrup, 12 ounces; boiled filtered water, 4 gallons. Mix well and add 3 ounces of dilute sulphuric acid. The cost of this is about 4½d. a gallon, and there is no cholera in a hogshead of it. In the Post Office it has to a great extent superseded "raw water and bad beer." It is healthy and refreshing, and a wine-glass full taken with a tumbler of filtered water is one of the best and cheapest drinks that men can take in hot weather, and particularly in weather when cholera is in the air and in every drop of noxious water that we drink.









SOUTHBY'S ECONOMIC GAS RANGES.

The principle of these economic gas ranges and roaster, as shown in the above illustration, differs from that of all other gas cooking apparatus, in that the gas is burnt in a chimney, the lower end of which is left freely open, while its upper end delivers a highly-heated current of air into the upper part of the vessel in which the articles to be cooked are placed; this vessel having no escape for the heated air except below the level of the articles to be cooked. Many advantages are claimed for this arrangement. 1st. The gas being burnt in a strong current of fresh air, the combustion is perfect. 2nd. The heated air escaping only at the bottom of the vessel instead of, as in other apparatus, at the top, it is that portion which has given out its heat to the articles in process of cooking that escapes instead of the hottest and unused portion, thus producing a much greater economy of gas. 3rd. The meat always being cooler than the air by which it is cooked, it is surrounded by a descending current which, the exit being at the bottom, escapes freely; whereas if the exit was at the top it could only eddy round and round. This secures that the great bulk of the air admitted into the apparatus shall pass immediately over the surface of the meat, carrying away with it all the vapours given off as fast as they are produced, thus insuring the same perfect ventilation as before an open fire, and preventing any possibility of the disagreeable flavour of oven-cooked meat. An incidental advantage of the even temperature secured by having only a bottom exit for the air, is that all the space in the apparatus is available for cooking; and also makes it an unrivalled oven for baking pastry.

Much surprise has been expressed at the makers of this gas cooking apparatus chosing illuminating jets in preference to the atmospheric burners, for which greater economy is usually claimed; but they maintain that the former have great advantages; at the same time for cooking purposes they are equally economical when properly used. Atmospheric burners of all kinds are liable to be lighted inside the mixing chamber, producing aeroline smoke and various other noxious products of imperfect combustion. The simple union jet is free from this objection; and, as they contend for the economy, a given amount of gas burnt freely in air must produce exactly the same amount of heat, for as long as the ultimate products are water and carbonic acid, only the same amount of oxygen can have been used, and the same amount of heat developed, the only difference being that in the atmospheric burner the carbon and hydrogen are both oxidised simultaneously, whereas in the illuminating jet the hydrogen burns first, intensely heating the particles of carbon, which thus become luminous, and are then perfectly oxidised as they come in contact with the air at the surface of the flame. The result of this is that the total heat developed is the same in both cases, for the same, amount of gas consumed; but whereas the hot gases produced by the air burner will only radiate about one-tenth of their heat, the rest being in the form of highly-heated gaseous matter, in the other about one-half the heat is developed in each form. If, therefore, the radiated heat is allowed freely to dissipate itself a larger portion is lost when illuminating jets are used, but if, as in this apparatus, the jets are surrounded by a chimney, so that the radiated heat cannot escape, the results would be the same in both cases in producing the comparatively moderate temperature required for cooking.

The patentee is A. G. Southby, Esq., and the manufacturers are the Economic Gas Range and Roaster Company, 2, Basset-street, Kentish-town, N.W.

APPLICATIONS FOR PATENTS.

Continued from Page 138.

lantern.—W. R. Evans. Repeating fire-arms. (Complete specification.)—H. Skoines. Manufacture of charcoal, black lead, lampblack, blacking moulders' oxydising black, black paint, and black japan from coke and other residues from the manufacture of gases used for illuminating purposes, carbonized from coking and cannel coal, shale, bitumen, or any oleaginous substances.—W. R. Lake. Machinery for drilling or perforating rocks and other hard substances (com.)—W. C. Alldridge. Collar studs, solitaires, sleeve links, and other like dress fastenings.—N. Lloyd. Obtaining heat for heating steam boilers, and for other purposes, and apparatus used for that purpose.—G. Zanni. Magneto electric Morse ink printing telegraphic apparatus.—E. Tweedale. Flyers for roving, slubbing, and other frames.—R. Luke. Locking or securing the movable points of railway bars or the switches of railways.—A. M. Clark. Steam and hydraulic breaks (com.)—G. Haseltine. Watering columns for railway water tanks (com.) (Complete specification.)—A. V. Newton. Propellers for canal boats and other vessels, and condensers for use in connection therewith (com.)—J. Petrie, jun. Machinery for scouring or washing and drying wool and other fibrous materials.—W. J. Henman. Reaping and mowing machines.

On July 1st.—2274 to 2282.—G. H. Dana. Manufacturing middlings flour (com.)—J. Whipp and W. W. Mellor. Tools for cutting or fracturing glass.—F. Cole and R. G. Acton. Using air as a motive power.—J. Spear. Flower-pot covers, window blinds, mats, kettle holders, and other like articles.—S. Dunn. Liquid for destroying vegetable life and checking its development.—J. Sturgeon. Machinery for compressing air.—H. H. Withers and J. Batchelor. Reaping or mowing machines, and the mode of tieing or binding into sheaves or bundles the corn or other produce cut thereby.—L. Chapman. Rotary pumps (Complete specification.)—W. Whitehouse. Apparatus for loading hay and other crops into waggons.

On July 2nd.—2283 to 2302.—E. Entwistle. Railway signals.—G. Haseltine. Looms for weaving (com.) (Complete specification.)—W. T. Wheatley. Fastening tires on wheels.—J. Roberts. "Proofing" felt hats.—G. Haseltine. Safety attachment for reaping and mowing machines (com.) (Complete specification.)—M. Pearson. Means or apparatus employed in fancy or figure weaving.—J. Combe. Machinery for winding cops.—O. Pritchard. New optical instrument for producing designs for art manufactures and other purposes.—S. Bidwell, J. Bidwell, and A. Bidwell. Tooth-brushes.—W. R. Lake. Apparatus for printing carpets and other similar fabrics (com.)—W. R. Lake. Manufacture of carpets and other similar fabrics (com.)—W. R. Lake. Manufacture of carpets, particularly applicable to carpets with a pile surface (com.)—J. Friedlander. Printing surfaces called "spongography."—J. H. Johnson. Inkstands (com.)—M. Rae. Treatment of finely divided iron ores, iron sands, or mine dust, with a view to smelting the same in blast furnaces.—J. A. Wade and J. Cherry. Carts.—H. Smith. Cartridges for breech-loading fire-arms.—R. Boby. Machinery for separating or sorting seeds.—F. Wilkinson and J. Elce. Machinery for spinning and doubling cotton and other fibrous materials.—W. R. Lake. Processes for plating iron, steel, and other metals with nickel (com.)

On July 3rd.—2303 to 2313.—G. Heywood and J. Duckworth. Boiling kiers employed in the cleansing or treating of woven fabrics and other materials, applicable in part to other descriptions of kiers.—E. Dwyer. Self-acting couplings for railway carriages and engines.—H. A. Bonneville. Steam engine brakes (com.)—C. Wood. Manufacture of bricks or blocks from granulated slag, and apparatus for that purpose.—B. Giles. Apparatus for heating water.—C. Hide. Process for protecting, finishing, and ornamenting walls and buildings.—J. A. Emslie and J. T. Emslie. Tell-tales and machinery therefor.—M. A. F. Mennons. Direct application of moving force (vis viva) to the propulsion of locomotive, marine, and other movable engines (com.)—G. Haseltine. Apparatus for distilling and barrelling turpentine and bleaching resin, and for other like purposes (com.) (Complete specification.)—W. J. Schlesinger. Tap for drawing champagne, lemonade, and other liquids from their bottles (com.)—S. B. Bamford. Cheese-making machines.

On July 4th.—2314 to 2329.—H. B. Barlow, jun. Machinery for washing and dyeing fibrous materials (com.)—J. B. Sutton. Self-acting lubricators for shafting and other bearings.—H. Bradley. Mode of preparing and printing designs or objects on metal or other surfaces by the agency of photography, such designs or objects so produced to be made permanent by the subsequent operation of the engraver, for the purpose of copper-plate or letter-press printing.—J. Marsden and J. Collins. Treatment of sewage water, and in the manufacture of manure.—J. Haithwaite. Apparatus for extracting chlorine from chloride of lime.—H. A. Isaacs and J. M. Isaacs. Addition to vessels or receptacles for edible substances.—F. Wirth. Washing machines (com.)—W. Peel. Looms for weaving.—J. Wulff. Fastener, chiefly designed for shoes, gloves, and other like articles. (Complete specification.)—J. C. Mewburn. Machinery for spinning and twisting or doubling fibrous materials (com.)—F. H. Varley and E. Furness. Couplings and appliances connected therewith.—W. Inglis and J. F. Spencer. Steam engines.—J. F. Spencer. Steam engines.—A. Browne. Electro-telegraphy (com.)—J. H. Apted. Breech-loading fire arms.—J. Hartley. Wrought, welded, rivetted, or other boilers for hot-water heating apparatus.

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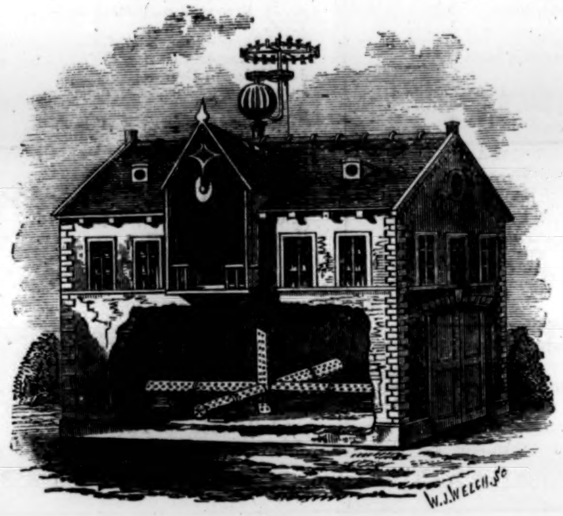

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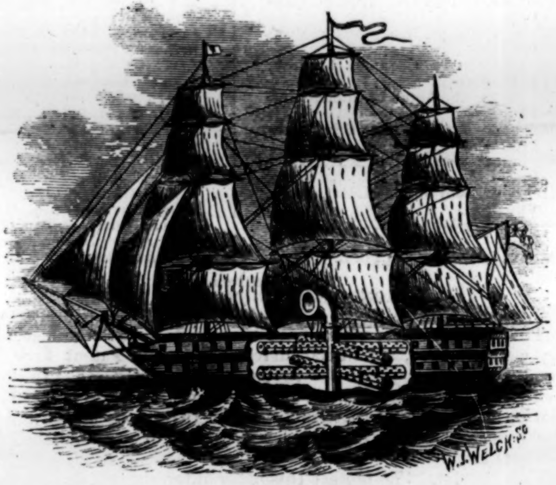

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